
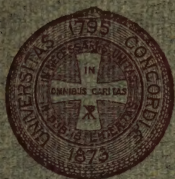


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ANNUAL CATALOGUE

OF

UNION UNIVERSITY



1914-1915

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UNION UNIVERSITY

Union University embraces the following institutions:
UNION COLLEGE, Founded 1795

Academic Department	{	Classical Course
		Latin Scientific Course
		Scientific Course

Engineering Department	{	General Engineering Course
(Founded 1845)		Sanitary Engineering Course
		Electrical Engineering Course

ALBANY MEDICAL COLLEGE, Founded 1838

ALBANY LAW SCHOOL, Founded 1851

DUDLEY OBSERVATORY, Founded 1852

ALBANY COLLEGE OF PHARMACY, Founded 1881

Union College acquired by its charter, granted in 1795, full university powers, but the creation of graduate institutions at Schenectady was not then found practicable. Schools of law and medicine and also an astronomical observatory have long existed at Albany, only a few miles distant. The arrangement naturally suggested by these circumstances was, that the professional schools and the observatory at Albany should be united with Union College, under the charter and board of trustees of the latter. This was accordingly effected by the incorporation of Union University in 1873. The Albany College of Pharmacy was created by the board of governors on June 21, 1881, and incorporated as a department of the university on August 21 of the same year.

The president of Union College and permanent chancellor of Union University has the oversight of the university, each of the institutions having its resident dean. The dean of Union College acts in the place of the president in the latter's absence and also has charge of matters delegated to him by the president. The university board of governors is composed of permanent trustees of Union College and of representatives of each of the other institutions embraced in Union University.

1914 — UNIVERSITY CALENDAR — 1915

1914

Fall term of Union College begins.....Monday, September 14
 First semester of Law School begins..Wednesday, September 23
 Winter term of Medical College begins..Tuesday, September 22
 Winter term of College of Pharmacy....Monday, September 28
 Election day — recess.....Tuesday, November 3
 Thanksgiving day — recess.....Thursday, November 26
 Fall term of Union College ends.....Wednesday, December 23

Christmas recess in all departments

1915

Sessions resumed.....Monday, January 4
 Day of prayer for colleges.....Thursday, January 28
 First semester of Law School ends.....Friday, January 29
 Second semester of Law School begins.....Monday, February 1
 Washington's birthday (Feb. 22) — recess..Monday, February 22
 Winter term of Union College ends.....Saturday, March 20
 Spring term of Union College begins.....Monday, March 22
 Easter recess.....Friday-Monday, April 2-5
 Commencement, College of Pharmacy.....Tuesday, April 27
 Commencement, Medical College.....Tuesday, May 25
 Memorial day (May 30) — recess.....Monday, May 31
 Commencement, Law School.....Wednesday, June 9
 Commencement week, Union College

Sunday-Wednesday, June 6-9

Entrance examinations, Union College,

Thursday-Friday, June 10-11

Fall term of Union College begins.....Monday, September 20
 First semester of Law School begins...Wednesday, September 22
 Winter term of Medical College begins...Tuesday, September 21
 Winter term of College of Pharmacy....Monday, September 27
 Election day — recess.....Tuesday, November 2
 Thanksgiving day — recess.....Thursday, November 25
 Fall term of Union College ends.....Thursday, December 23

For calendars of departments, see Pages 21, 158, 169, 174.

OFFICERS OF THE UNIVERSITY

Chancellor

CHARLES ALEXANDER RICHMOND, D. D., LL. D.

Honorary Chancellor, 1914

ELIHU ROOT, LL. D.

Board of Governors

President, SIMON W. ROSENDALE, LL. D., Albany

Vice-President, AMASA J. PARKER, LL. D.

Secretary, J. NEWTON FIERO, LL. D., Albany

Union College

SILAS B. BROWNELL, LL. D.....	New York City
EDWARD WINSLOW PAIGE, LL. D.....	New York City
GEORGE ALEXANDER, D.D.....	New York City
WARNER MILLER, LL. D.....	Herkimer
NICHOLAS V. V. FRANCHOT, A. M.....	Olean
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ALONZO P. STRONG, A. B.	Schenectady
EDGAR S. BARNEY, SC. D.....	New York City
FRANKLIN H. GIDDINGS, LL. D.....	New York City
COURTLAND V. ANABLE.....	New York City

Albany Medical College

SIMON W. ROSENDALE, LL. D.....	Albany
ALDEN CHESTER	Albany

Albany Law School

AMASA J. PARKER, LL. D.....	Albany
J. NEWTON FIERO, LL. D.....	Albany

Dudley Observatory

SAMUEL B. WARD, M. D., PH. D.....	Albany
BENJAMIN WALWORTH ARNOLD.....	Albany

Albany College of Pharmacy

WILLIS G. TUCKER, M. D., PH. D.....	Albany
CHARLES NEWMAN	Albany

UNIVERSITY FACULTY

CHARLES ALEXANDER RICHMOND, D. D., LL. D.
Chancellor

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Dean of Union College and Professor of History and Government

WILLIS G. TUCKER, M. D., PH. D.
Dean of the Medical College, Dean of the College of Pharmacy,
and Professor of Chemistry and Toxicology

J. NEWTON FIERO, LL. D.
Dean of the Law School and Lecturer on the Law of Procedure,
Equity, Torts, Evidence, Wills, Current Law, Trusts
and Trustees, and Development of the Law

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Director of Dudley Observatory

SAMUEL B. WARD, M. D., PH. D.
Professor Emeritus of Theory and Practice of Medicine

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JAMES P. BOYD, M. D.
Professor Emeritus of Obstetrics and Diseases of Children

CYRUS S. MERRILL, M. D.
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GUSTAVUS MICHAELIS, PH. G.,
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Secretary of the College of Pharmacy and Professor of Botany
and Materia Medica

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Ichabod Spencer Professor of Philosophy

OLIN H. LANDRETH, A. M., C. E., Sc. D.
Professor of Civil Engineering

JAMES H. STOLLER, A. M., PH. D.

Professor of Biology and Geology

EDWARD E. HALE, JR., PH. D.

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Professor of Chemistry

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GEORGE LAWYER

Professor of the Law of Contracts, Personal Property and Sales, Bankruptcy, and Damages

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Professor of the Law of Real Property and of Statutes and Statutory Construction

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JACOB C. E. SCOTT
Professor of Criminal Law

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Professor of the Latin Language and Literature

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Professor of Gynecology

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Professor of Civil Law, International Law, and Conflict of Laws

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Professor of Neurology

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HON. ALDEN CHESTER
Lecturer on the Federal Judicial System

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JOHN H. GUTMANN, M. D.
Clinical Professor of Surgery

ALVAH H. TRAVER, M. D.
Clinical Professor of Surgery

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Lecturer on Physiology

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Assistant in Dudley Observatory

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Instructor in Diseases of the Throat and Nose

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Instructor in Oral Pathology

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Assistant in Dudley Observatory

RICHARD A. LAWRENCE, M. D.
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NELSON K. FROMM, M. D.
Instructor in Medicine

TIFFANY LAWYER, M. D.
Instructor in Gynecology

EDWIN L. DRAPER, M. D.
Instructor in Surgery and Surgical Pathology

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Instructor in Diseases of Throat and Nose

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Instructor in Commercial Pharmacy

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Instructor in Medicine

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Instructor in Surgery

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Instructor in Chemistry

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Instructor in Mathematics

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Instructor in American History

JOHN F. SOUTHWELL, M. D.
Instructor in Surgery

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Instructor in Pharmacy and Chemistry

EVERETT S. LEE, B. S.
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Instructor in Pharmacy and Mathematics

LEROY G. MATTHEWS, PH. G.
Instructor in Physics

THOMAS W. JENKINS, M. D.
Instructor in Histology

DAVIS BAKER, M. D.
Instructor in Surgery

CHARLES F. MYERS, M. D.
Instructor in Histology and Embryology

CLIFFORD S. PARKER, M. A.
Instructor in French and German

GEOFROY ATKINSON, M. A.
Instructor in Modern Languages

GUY C. WEEKS, B. A., B. S.
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MORTIMER F. SAYRE, E. M., A. M.
Instructor in Engineering

GRANT HUNTLEY, C. E.
Instructor in Mathematics

LUTHER A. HAGAR, B. E.
Instructor in Mathematics

LOUIS B. MOUNT, M. D.
Instructor in Dermatology

WILLIAM D. ALDRICH, M. D.
Instructor in Surgery and Genito-Urinary Surgery

ARTHUR E. PITTS, M. D.
Instructor in Surgery

LEMUEL W. GORHAM, M. D.
Instructor in Medicine

MARCUS D. CRONIN, M. D.
Instructor in Surgery

ARTHUR B. VAN LOON, M. D.
Instructor in Surgery

JOSEPH P. O'BRIEN, M. D.
Instructor in Medicine

MORRIS B. BEECROFT, M. D.
Instructor in Bacteriology and Pathology

GEORGE V. GENZMER, M. D.
Instructor in Bacteriology and Pathology

CLARENCE E. MULLENS, M. D.
Instructor in Materia Medica

WILLIAM C. RAUSCH, M. D.
Instructor in Obstetrics

GANET M. CLOWE, M. D.
Instructor in Physiology

JOSEPH H. BOWERS
Instructor in Obstetrics

FRANK VANDER BOGERT
Instructor in Pediatrics

RICHARD B. GRAY, M. D.
Assistant in Microscopical Laboratory

LEROY JENKINS, A. B.
Assistant in Dudley Observatory

LEROY Z. MEARNS, C. E.
Assistant in Dudley Observatory

WILLIAM HUNT
Assistant in Dudley Observatory

ROY E. ABBEY, B. A.
Assistant in Biological Laboratory

WARREN C. VOSBURGH
Assistant in Chemical Laboratory

UNION COLLEGE

Union College was incorporated by the Regents of the University of the State of New York on the 25th day of February, 1795. It was the second college incorporated in the state, and the first north of the city of New York and west of the Hudson river. It received its name from the circumstance that several religious denominations co-operated in its organization, and it was the first college in the United States which was not of a strictly denominational character. It has continued from its foundation to be a representative institution of Christian unity.

The first president of Union College was the Rev. John Blair Smith, of Philadelphia. He was elected in 1795, and resigned in 1799, only a few months before his death. He was succeeded by Jonathan Edwards, the younger, who died in 1801. The Rev. Jonathan Maxcy, previously president of Brown University, succeeded Dr. Edwards, resigning at the end of two years. In 1804 the Rev. Eliphalet Nott was elected president of Union College, which office he held until his death, on the 29th day of January, 1866. The Rev. Laurens P. Hickok, a graduate of the college, who had long acted as vice-president, was elected his successor. He resigned in 1868. The Rev. Charles A. Aiken succeeded Dr. Hickok in 1869, and resigned in 1871. The Rev. Eliphalet Nott Potter was elected president in 1871, and was inaugurated June 20, 1872. On his resignation, in 1884, the Hon. Judson S. Landon was appointed president *ad interim*, and served until the inauguration of Harrison E. Webster, who was elected president May 23, 1888, and inaugurated June 26, 1888. On his resignation, in January, 1894, Rev. Andrew V. V. Raymond was elected president, and was inaugurated in June, 1894. Dr. Raymond resigned July 18, 1907, and the Rev. George Alexander was appointed president *ad interim*. On January 28, 1909, Rev. Charles Alexander Richmond was elected president. Dr. Richmond was inaugurated June 7, 1909.

1914															
	S	M	T	W	T	F	S		S	M	T	W	T	F	S
Sept.	..	..	I	2	3	4	5	Nov.	I	2	3	4	5	6	7
	6	7	8	9	10	11	13		8	9	10	11	12	13	14
	13	14	15	16	17	18	19		15	16	17	18	19	20	21
	20	21	22	23	24	25	26		22	23	24	25	26	27	28
	27	28	29	30	..	..	..		29	30	..	..	..	..	..
Oct.	..	..	..	..	..	..	..	Dec.	..	..	1	2	3	4	5
	..	..	..	..	1	2	3		6	7	8	9	10	11	12
	4	5	6	7	8	9	10		13	14	15	16	17	18	19
	11	12	13	14	15	16	17		20	21	22	23	24	25	26
	18	19	20	21	22	23	24		27	28	29	30	31	..	..
25	26	27	28	29	30	31	..	..	..	..	..	..	..	..	..
1915															
	S	M	T	W	T	F	S		S	M	T	W	T	F	S
Jan.	..	..	..	..	..	I	2	July	..	..	..	..	I	2	3
	3	4	5	6	7	8	9		4	5	6	7	8	9	10
	10	11	12	13	14	15	16		11	12	13	14	15	16	17
	17	18	19	20	21	22	23		18	19	20	21	22	23	24
	24	25	26	27	28	29	30		25	26	27	28	29	30	31
Feb.	31	..	..	..	..	..	..	Aug.	..	..	..	..	..	..	..
	..	1	2	3	4	5	6		I	2	3	4	5	6	7
	7	8	9	10	11	12	13		8	9	10	11	12	13	14
	14	15	16	17	18	19	20		15	16	17	18	19	20	21
	21	22	23	24	25	26	27		22	23	24	25	26	27	28
Mar.	28	..	..	..	..	..	..	Sept.	29	30	31	..	..	..	..
	..	1	2	3	4	5	6		..	..	..	..	..	..	..
	7	8	9	10	11	12	13		5	6	7	8	9	10	11
	14	15	16	17	18	19	20		12	13	14	15	16	17	18
	21	22	23	24	25	26	27		19	20	21	22	23	24	25
Apr.	28	29	30	31	..	..	..	Oct.	26	27	28	29	30	..	..

	..	..	..	..	1	2	3		..	..	..	..	..	1	2
	4	5	6	7	8	9	10		3	4	5	6	7	8	9
	11	12	13	14	15	16	17		10	11	12	13	14	15	16
May	18	19	20	21	22	23	24	Nov.	17	18	19	20	21	22	23
	25	26	27	28	29	30	..		24	25	26	27	28	29	30
	..	..	..	..	..	..	..		31	..	..	..	..	..	..

	2	3	4	5	6	7	8		..	1	2	3	4	5	6
June	9	10	11	12	13	14	15	Dec.	7	8	9	10	11	12	13
	16	17	18	19	20	21	22		14	15	16	17	18	19	20
	23	24	25	26	27	28	29		21	22	23	24	25	26	27
	30	31	..	..	..	..	..		28	29	30	..	..	..	..

June	..	1	2	3	4	5	..	Dec.	..	..	..	1	2	3	4
	6	7	8	9	10	11	12		5	6	7	8	9	10	11
	13	14	15	16	17	18	19		12	13	14	15	16	17	18
	20	21	22	23	24	25	26		19	20	21	22	23	24	25
	27	28	29	30	..	..	..		26	27	28	29	30	31	..

Figures in heavy type indicate days on which Union College is in session

UNION COLLEGE CALENDAR

1914

Conditions examinations.....Saturday, September 12
 Registration day for freshmen.....Monday, September 14
 Entrance examinations....Tuesday-Wednesday, September 15-16
 Registration.....Tuesday, Wednesday, September 15-16
 First chapel exercises and recitations....Thursday, September 17
 Senior reception to entering students.....Friday, September 18
 Election day — recess.....Tuesday, November 3
 Thanksgiving day — recess, three days..Thursday, November 26
 Allison-Foote prize debate.....Friday, December 4
 Conditions examinations.....Friday-Saturday, December 4-5
 Fall term ends.....Wednesday, December 23

1915

Registration day for students, winter term..Thursday, January 4
 Recitations begin.....Tuesday, January 5
 Day of prayer for colleges.....Thursday, January 28
 Washington's birthday (Feb. 22) — recess..Monday, February 22
 Conditions examinations.....Friday-Saturday, March 5-6
 Winter term ends.....Saturday, March 20
 Registration day for students, spring term....Monday, March 22
 Recitations begin.....Tuesday, March 23
 Easter recess.....Friday-Monday, April 2-5
 Selection of junior and sophomore orators...Thursday, April 15
 Conditions examinations.....Friday-Saturday, April 30-May 1
 Presentation of prize essays.....Saturday, May 1
 Senior examinations end.....Saturday May 22
 Memorial Day (May 30) — recess.....Monday, May 31
 Spring term examinations end.....Saturday, June 5
 Baccalaureate sermonSunday, June 6
 Prize oratory of juniors and sophomores.....Monday, June 7
 Meeting of trustees, societies, alumni.....Tuesday, June 8
 President's receptionTuesday, June 8
 Commencement, second Wednesday in June..Wednesday, June 9
 Entrance examinations.....Thursday-Friday, June 10-11
 Conditions examinations.....Saturday, September 18

Fall Term, 1915-1916, beginsMonday, September 20

TRUSTEES OF UNION COLLEGE

Ex-Officio. { HIS EXCELLENCY MARTIN H. GLYNN, Governor
 HON. ROBERT F. WAGNER, Lieutenant-Governor
 HON. MITCHELL MAY, Secretary of State
 HON. WILLIAM SOHMER, Comptroller
 HON. HOMER D. CALL, Treasurer
 HON. JAMES A. PARSONS, Attorney-General

SILAS B. BROWNELL, LL. D., 71 Wall street, New York

HON. EDWARD W. PAIGE, LL D., 46 Cedar street, New York

REV. GEORGE ALEXANDER, D.D., 47 University place, New York

HON. WARNER MILLER, LL. D., Herkimer

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COURSES OF STUDY

1. Courses leading to the Degree of A. B.

Classical Course A. Greek, as indicated on page 35, is required for admission to this course. Latin and Greek are required for two years. In the last two years of this course all studies are elective.

Classical Course B. At the end of the sophomore year students in the Ph. B. course may, if proficient in Latin, elect to be candidates for the A. B. degree. They must then take up the study of Greek and continue it during the junior and senior years. With this exception all studies are elective in the last two years of this course.

2. Course leading to the Degree of Ph. B.

Latin-Scientific Course. This course offers Latin without Greek, for which is substituted additional work in modern languages and science. In the last two years of the course all studies are elective.

3. Course leading to the Degree of B. S.

Scientific Course. This course is based upon the study of mathematics and the sciences, with extended work in English and other modern languages. In the last two years of the course all studies are elective.

Students in full standing at the end of junior year who have the profession of medicine in view are permitted to take the first year studies of the Albany Medical College as a substitute for the studies of the senior year in Union College. This enables medical students to lessen the time of their academic and professional studies by one year. The academic degree is conferred on the successful completion of the first year in the Medical College.

4. Courses leading to the Degree of B. E.

General Engineering Course. This course offers the foundation of a broad engineering education, comprising mathematics, the sciences, the fundamental principles of the special branches of the profession, some training in history and economics, a knowledge of both French and German and a course in English.

During the third and fourth years two alternative options are offered.

Option A. In this division the fundamental principles of advanced technical subjects receive emphasis.

Option B. In this division studies are offered which lead to a training for engineering positions of an executive or administrative nature.

Sanitary Engineering Course. This differs from the general engineering course by substituting special work in sanitary engineering for some of the general engineering studies of the junior and senior years.

Electrical Engineering Course. This course is intended to give a broad and thorough engineering education, with the specific instruction requisite for electrical engineering. During the first two years of the course the work is the same as in the general engineering department; during the junior and senior years the two courses are wholly distinct.

5. One Year Pre-Medical Course

This course is offered to meet the requirements for admission to the Medical Department of Union University in accordance with the recommendations of the American Medical Association.

6. Courses leading to Graduate Degrees

Course leading to degree of M. C. E. This course of one year's graduate study, consists of lectures, laboratory practice and research work, and is open to graduates of the general or the sanitary engineering course of Union College, or of any other institution of a standing recognized by the faculty.

Course leading to degree of M. S. in E. E. This course of one year's graduate study, consists of lectures, laboratory practice and research work, and is open to graduates of the electrical engineering course of Union College, or of any other institution of a standing recognized by the faculty.

Course leading to degree of Ph. D. This course of two years' graduate study requires for admission the degree of M. E. E. or an equivalent. For details of the work see page 116.

REQUIREMENTS FOR ADMISSION

Application and Registration

Blank forms of application to be filled out and forwarded in advance will be furnished by the secretary on request.

Candidates must be at least sixteen years old, and as a preliminary to registration, whether for examination or for enrollment, must present themselves at the office of the secretary on the date named in the calendar published in the college catalogue for the current year, and submit satisfactory testimonials of character.

Methods of satisfying the Requirements

By Examination. The regular entrance examinations are held on the Thursday and Friday immediately following Commencement, and on the Tuesday and Wednesday of the first week of the fall term. The schedule of examinations is given on pages 40-41. Candidates for examination in any subject are expected to present a recommendation from their school principal.

By C. E. E. B. Certificate. Candidates may take the uniform entrance examinations offered by the College Entrance Examination Board. The examinations of the board are held in June of each year, and a list of the places at which they are to be held is published by the board about March 1st. Applications to attend the board's examinations must be addressed to the *Secretary of the College Entrance Examination Board, P. O. Sub-Station 84, New York, N. Y.*, and must be made upon a blank form to be obtained from the secretary of the board upon application. The certificates of this board will be accepted for all subjects passed at a satisfactory grade.

By Regents Diploma. The academic and college entrance diplomas issued by the New York State Education Department will be accepted so far as they cover the requirements for admission to the course desired.

By School Certificate. Certificates from schools approved by the faculty will be accepted for graduates of the school if they

cover the requirements for admission to the course desired and contain a recommendation from the principal of the school that the candidate be admitted to college. Blank certificates, to be filled out by principals of schools, will be furnished upon application to the *Secretary of the Faculty, Union College, Schenectady, N. Y.*

So far as possible all credentials should be forwarded by July 10 of the year in which the candidate desires to enter, and it is expected that all certificates will be submitted not later than September 1st.

Students who enter the freshman class by certificate and fail to maintain their class standing are required to pass entrance examinations in the departments in which they have failed, if they apply for readmission.

Subjects Required for Admission to Each Course

Candidates for admission to the freshman class in any course must meet the requirements specified for that course. The subjects are numbered as in the general list given on pages 32-40.

The term *unit* is used in this catalogue in the sense established by the Carnegie Foundation and the College Entrance Examination Board, and means a course of 4 or 5 periods weekly throughout an academic year of the preparatory school.

A.B. Course, A. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
2. Greek: a, b	See Page 35.....	2 units
3. Latin: a, b, c, d.	See Page 35.....	4 units
5. Mathematics: a, b.....	See Page 37.....	2½ units
8. Electives.....	See Page 39.....	2½ units

Total 14 units

Ph.B. Course and A.B. Course^B. For admission to these courses the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
3. Latin: a, b, c, d.	See Page 35.....	4 units
4. Modern Languages: a or b...See Page 36.....		2 units
5. Mathematics: a, b.....	See Page 37.....	2½ units
7. History: a, b, c.....	See Page 39.....	2 units
8. Electives	See Page 39.....	½ unit

Total 14 units

B.S. Course. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
*4. Modern Languages: a or b...	See Page 36.....	2 units
5. Mathematics: a, b, c.....	See Page 37.....	3 units
6. Science.....	See Page 38.....	1½ units
7. History: c.....	See Page 39.....	1 unit
*8. Electives.....	See Page 39.....	3½ units

Total 14 units

* Latin a-d, page 35, may be substituted for the requirement in modern languages. Latin a-d and Greek a-b, page 35, may be substituted for the requirement in modern language and electives.

B.E. Course. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
4. Modern Languages: a or b...	See Page 36.....	2 units
5. Mathematics: a, b, c.....	See Page 37.....	3 units
6. Science.....	See Page 38.....	1½ units
7. History: c.....	See Page 39.....	1 unit
8. Electives.....	See Page 39.....	3½ units

Total 14 units

Pre-Medical Course. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
4. Modern Languages: a or b...	See Page 36.....	2 units
5. Mathematics: a, b, c.....	See Page 37.....	3 units
6. Science.....	See Page 38.....	1½ units
7. History: c.....	See Page 39.....	1½ units
8. Electives.....	See Page 39.....	3½ units

Total 14 units

Advanced Standing. Candidates from other colleges must bring letters of honorable dismissal, and upon the presentation of acceptable certificates will be admitted to corresponding standing. Candidates for a degree must enter not later than the beginning of the senior year.

Requirements in Individual Subjects

1. English (3 units)

The books named in the following lists are prescribed for study in English:

Preparation for Part I (1½ units) should aim to give the

power of clear and accurate expression, and a general knowledge of the substance of the books. In an examination the candidate will be called upon to write a paragraph or two on each of several topics, to be chosen from a considerable number — perhaps ten or fifteen — set before him in the examination paper. In every case the ability to write good English will be regarded as more important than knowledge of the books. It is important that the candidate be instructed in the fundamental elements of rhetoric. No candidate will be accepted in English whose work is notably defective in point of spelling, punctuation, grammar, or division into paragraphs.

Preparation for Part II (1½ units) should include a thorough study of each of the works named below, so as to give a knowledge of the subject-matter, form and structure. In addition, the candidate should be well grounded in the essentials of English grammar, and in the leading facts in those periods of English literary history to which the prescribed works belong. For the latter part of the work, Newcomer's Introduction to English Literature and Moody and Lovett's First View of English Literature are recommended.

For students entering in 1915, the books required for reading and study will be as follows:

List 1 for General Reading

At least ten units — each unit is set off by semicolons — are to be selected, two from each group.

Group I

The Old Testament, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther; the Odyssey, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII; the Iliad, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI; Virgil's Aeneid. The Odyssey, Iliad, and Aeneid should be read in English translations of recognized literary excellence.

For any unit of the above group a unit from any other group may be submitted.

Group II

Shakespeare's Merchant of Venice, Midsummer Night's Dream, As You Like It, Twelfth Night, Henry the Fifth, Julius Cæsar.

Group III

Defoe's Robinson Crusoe, Part I; Goldsmith's Vicar of Wakefield; either Scott's Ivanhoe or Quentin Durward; Hawthorne's House of the Seven Gables; either Dickens' David Copperfield or Tale of Two Cities; Thackeray's Henry Esmond; Mrs. Gaskell's Cranford; George Eliot's Silas Marner; Stevenson's Treasure Island.

Group IV

Bunyan's Pilgrim's Progress, Part I; The Sir Roger de Coverley Papers in the Spectator; Franklin's Autobiography; Irving's Sketch Book; Macaulay's Essays on Lord Clive and Warren Hastings; Thackeray's English Humourists; Selections from Lincoln, including at least the two Inaugurals, the Speeches in Independence Hall and at Gettysburg, the Last Public Address, and Letter to Horace Greeley, with a brief memoir or estimate; Parkman's Oregon Trail; either Thoreau's Walden, or Huxley's Autobiography and selections from Lay Sermons, including the addresses on Improving Natural Knowledge, A Liberal Education, and A Piece of Chalk; Stevenson's Inland Voyage and Travels with a Donkey.

Group V

Palgrave's Golden Treasury (First Series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns; Gray's Elegy in a Country Churchyard and Goldsmith's Deserted Village; Coleridge's Ancient Mariner and Lowell's Vision of Sir Launfal; Scott's Lady of the Lake; Byron's Childe Harold (Canto IV.), and Prisoner of Chillon; Palgrave's Golden Treasury (First Series), Book IV, with especial attention to Wordsworth, Keats, and Shelley; Poe's Raven, Longfellow's Courtship of Miles Standish, and Whittier's Snow Bound; Macaulay's Lays of Ancient Rome, and Arnold's Sohrab and Rustum; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Browning's Cavalier Tunes, The Lost Leader,

How They Brought the Good News from Ghent to Aix, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, Hervé Riel, Pheidippides, My Last Duchess, Up at a Villa—Down in the City.

List 2 for Minute and Critical Study

Shakespeare's *Macbeth*; Milton's *Lycidas*, *L'Allegro*, *Il Penseroso*, and *Comus*; either Burke's *Speech on Conciliation with America*, or both Washington's *Farewell Address* and Webster's *First Bunker Hill Oration*; either Macaulay's *Life of Johnson*, or Carlyle's *Essay on Burns*.

2. Greek (2 units)

a. Grammar and Composition (1 unit). The common forms, idioms, and constructions, and the general grammatical principles of Attic Greek prose. Translation into Greek of detached sentences and very easy continuous prose based upon the *Anabasis*.

b. Xenophon (1 unit). The first four books of the *Anabasis*.

In connection with the reading in Greek there should be constant practice in sight translation and in prose composition.

c. Greek (Homer: The Iliad, book I, book II, 1-483, and book III; Homeric constructions, forms, and prosody) is the preferred elective for classical students.

3. Latin (4 units)

a. Grammar and Composition (1 unit). The inflections; the simpler rules for composition and derivation of words; syntax of cases and the verb; structure of sentences in general, with particular regard to relative and conditional sentences, indirect discourse, and the subjunctive. Translation into easy Latin of detached sentences and very easy continuous prose based upon Caesar and Cicero.

b. Caesar (1 unit). Any four books of the *Gallic War*.

c. Cicero (1 unit). Any six orations from the following list, or equivalents: The four orations against Catiline, Archias, The Manilian Law, Marcellus, Roscius, Milo, Sestius, Ligarius, the fourteenth Philippic.

d. Vergil (1 unit). The first six books of the Aeneid, and so much prosody as relates to accent, versification in general, and dactylic hexameter.

Equivalents in b, c, or d, will be accepted at the discretion of the head of the department.

Every student is required to use in the college class room the Roman Method of pronunciation, and is expected to have had practice in this method at school.

4. Modern Languages (2 units)

a. German (2 units). Two years' work will be necessary to meet this requirement.

During the first year the work should comprise: 1. careful drill upon pronunciation; 2. the memorizing and frequent repetition of colloquial sentences; 3. drill upon the rudiments of grammar, that is, upon the inflection of the article, of such nouns as belong to the language of every-day life, of adjectives, pronouns, weak verbs, and the more usual strong verbs; also upon the use of the more common prepositions, the simpler uses of the modal auxiliaries, and the elementary rules of syntax and word-order; 4. abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; 5. the reading of from 75 to 150 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson, the teacher giving the English, and in reproducing from memory sentences previously read.

During the second year the work should comprise: 1. the reading of from 150 to 250 pages of literature in the form of stories and plays; 2. accompanying practice, as before, in the translation into German of easy variations upon the matter read and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; 3. continued drill upon the rudiments of the grammar, with constant applications in the construction of sentences.

b. French (2 units). Two years' work will be necessary to meet this requirement.

During the first year the course should include: 1. careful drill in pronunciation; 2. the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural nouns, the inflection of adjectives, participles, and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence and the elementary rules of syntax; 3. abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; 4. the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice of translating into French easy variations of the sentences read, the teacher giving the English, and in reproducing from memory sentences previously read; 5. writing French from dictation.

During the second year the work should comprise: 1. the reading of from 250 to 400 pages of easy modern prose in the form of stories, plays, or historical or biographical sketches; 2. constant practice, as in the previous year, in translating into French easy variations upon the texts read; 3. frequent abstracts, sometimes oral and sometimes written, or portions of the text already read; 4. writing French from dictation; 5. continued drill upon the rudiments of grammar, with constant application in the construction of sentences; 6. mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

5. Mathematics ($2\frac{1}{2}$ units; 3 units)

a. Algebra. ($1\frac{1}{2}$ units). The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions, ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of

polynomials and of numbers; exponents, including the fractional and negative.

Simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations.

Problems depending upon quadratic equations.

The binomial theorem for positive integral exponents.

The formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

b. Plane Geometry (1 unit). The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle.

The solution of numerous original exercises, including loci problems.

Application to the mensuration of lines and plane surfaces.

c. Solid Geometry ($\frac{1}{2}$ unit). The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms; pyramids, cylinders, and cones; the sphere and the spherical triangle.

The solution of numerous original exercises, including loci problems.

Applications to the mensuration of surfaces and solids.

6. Science ($1\frac{1}{2}$ units)

a. Physics (1 unit). An elementary knowledge of physics, such as may be gained by a year's course of study covering mechanics, sound, heat, light and electricity, as treated in any standard high school text book. Preparation should include individual laboratory work, attested by a note-book, comprising at least thirty-five exercises, chiefly quantitative.

b. Physiology ($\frac{1}{2}$ unit). A study of the nature of foods and their history in the body; the essential facts of digestion, absorption, circulation, secretion, excretion, and respiration; the motor,

nervous, and sensory functions; and the structure of the various organs by which these operations are performed. A note-book with careful outline drawings of the chief structures studied anatomically, together with explanations of these drawings, and the study of a good text-book are essential.

The above-named sciences are preferred. The following will be accepted. The figure in parenthesis shows the unit value:

- | | |
|------------------------|-----------------------------|
| c. Chemistry. | f. Botany.(1) |
| d. Biology.(1) | g. Physiography.(1) |
| e. Zoology.(1) | |

In every instance the work expected is that outlined for the given subject in the reports of the College Entrance Examination Board and the Carnegie Foundation, or in the Syllabus of the New York State Education Department.

7. History (1 unit; 2 units)

a. **Greek History** ($\frac{1}{2}$ unit). In this study must be included the geography of ancient Greece.

b. **Roman History** ($\frac{1}{2}$ unit). In this study must be included the geography of the Roman Empire.

c. **History of the United States** (1 unit).

Elementary United States history will be accepted if the candidate presents in addition a year of history not otherwise required.

8. Electives ($\frac{1}{2}$ unit; 3 units; $3\frac{1}{2}$ units)

In completing the requirements for admission to each course a fixed number of elective units in subjects not already taken from other groups must be offered from the list below.

In every instance the work expected is that outlined for the given subject in the reports of the College Entrance Examination Board and the Carnegie Foundation, or in the Syllabus of the New York State Education Department.

- | | |
|---|----------------------|
| For admission to the A. B. course..... | $2\frac{1}{2}$ units |
| For admission to the Ph. B. course..... | $\frac{1}{2}$ unit |
| For admission to the B. E. course..... | $3\frac{1}{2}$ units |
| For admission to the B. S. course..... | $3\frac{1}{2}$ units |

The figure in parenthesis after each subject shows the unit value of that subject.

Greek: 2, 3.....	(3)	Greek History	($\frac{1}{2}$)
Latin: 2, 3, 4.....	(4)	Roman History	($\frac{1}{2}$)
French 3	(1)	English History	(1)
German 3	(1)	History of English Literature...	($\frac{1}{2}$)
Spanish 2	(1)	Plane Trigonometry	($\frac{1}{2}$)
Civics.	($\frac{1}{2}$)	Spherical Trigonometry.....	($\frac{1}{2}$)
Physics.	(1)	Drawing.	(1)
Chemistry.	(1)	Zoology.	(1)
Physiology.	($\frac{1}{2}$)	Botany.	(1)
Biology.	(1)	Physiography.	(1)

Entrance Examinations in 1915

Entrance examinations will be held at the college in June and in September, in accordance with the schedule given below. A fee of five dollars is required at the time of registration.

Only those who register at the appointed time will be admitted to the examinations of the following days.

Schedule of the June Examinations

Thursday, June 10

8.30 A. M. Candidates register at the office of the secretary

English a	Page 32	9 A. M. to 11 A. M.
English b	" 33	11 A. M. " 1 P. M.
Mathematics a	" 37	2 P. M. " 4 P. M.
Mathematics b, c.....	" 38	4 P. M. " 6 P. M.

Friday, June 11

Greek, Latin	Page 35	9 A. M. to 11 A. M.
French, German	" 36, 37.....	11 A. M. " 1 P. M.
History	" 39	2 A. M. " 4 P. M.
Science	" 38	4 P. M. " 6 P. M.

Schedule of the September Examinations*Monday, September 20*

9 A. M. Candidates register at the office of the secretary.

Tuesday, September 21

English a	.....	Page 32	.....	9 A. M. to	II A. M.
English b	.....	" 33	.....	II A. M. "	I P. M.
Mathematics a	.....	" 37	.....	2 P. M. "	4 P. M.
Mathematics b, c	.....	" 38	.....	4 P. M. "	6 P. M.

Wednesday, September 22

Greek, Latin	.....	Page 35	.....	9 A. M. to	II A. M.
French, German	.....	" 36, 37	.....	II A. M. "	I P. M.
History	. . . . .	" 39	.....	2 P. M. "	4 P. M.
Science	. . . . .	" 38	.....	4 P. M. "	6 P. M.

DEPARTMENTS OF INSTRUCTION

The Greek Language and Literature

PROFESSOR BENNETT

The aim of the formal instruction in Greek is to impart an exact knowledge of the Greek language and a thorough acquaintance with a few good Greek books. The books read are varied from year to year, except that the sophomore course is in history and affords an introduction to the elective studies in history offered in the junior and senior years. Collateral reading in history, archaeology, art, and literature is required of all students in Greek. The courses leading to the degree of bachelor of arts at Union College are classical courses, Greek as well as Latin being required of all candidates for that degree. Two courses are offered. For admission to course A, Greek is required; it is continued during the freshman and sophomore years and may be elected during the junior and senior years. Honors are awarded to qualified candidates in this course. Course B is open to students in the course leading to the degree of bachelor of philosophy who are proficient in the study of Latin during the freshman and sophomore years. At the time appointed for choosing junior electives such students may elect to become candidates for the degree of bachelor of arts. They must then take up the study of Greek and continue it for six hours weekly during the junior and senior years. With this exception and that of English composition, election is free for classical students in the two latter years and may be made in any of the main departments of knowledge taught. The modern language taken in the sophomore year of course A may be continued and other modern languages begun. Preparation to meet requirements of medical colleges in science may be made by election. Course B as given prior to 1913-1914 is no longer offered except for students already entered in it.

The courses for the year 1914-1915 are as follows:

1. **Xenophon:** The Memorabilia: Book I, and the Choice of Hercules and other selections. **Plato:** The Apology, the Crito, and parts of the Phaedo. **Aristophanes:** The Clouds. **Compo-**

sition. Botsford's History of the Ancient World. Tarbell's History of Greek Art. Dickinson's The Greek View of Life.

Required of freshmen in course A. Four hours weekly.

2. Herodotus: Books VII and VIII. **Aeschylus:** The Persae. **Thucydides:** Books I and II. **Demosthenes:** The Orations against Philip. Browning's General History of the World. Cunningham's Western Civilization.

Required of sophomores in course A. Four hours weekly.

3. Herodotus: Books VI, VII, and VIII. **Thucydides:** Books I, II, VI, and VII. **Demosthenes:** On the Crown. Whitney's Life and Growth of Language. Grant's Greece in the Age of Pericles. Hogarth's Philip and Alexander of Macedon.

Elective for juniors and seniors in course A. Three hours weekly.

4. Homer: The Iliad, Books I, II, III, and VI; the Odyssey, Books I-IV, and IX-XII. **Euripides:** The Medea. Trench's The Study of Words. Livingstone's The Greek Genius and Its Meaning to Us. Butcher's Some Aspects of the Greek Genius.

Required of students in course B of the classes of 1915 and 1916. Three hours weekly.

5. Aristotle: The Ethics. **Plato:** The Phaedo. Gomperz's Greek Thinkers. **Thesis.**

Required for Honors. Three hours weekly. Candidates for honors are required to take also Greek 3 and Latin 4.

The Latin Language and Literature

PROFESSOR KELLOGG

The studies of this department are required, in the freshman and sophomore years, of all students who are candidates for either one of the two degrees, A. B. and Ph. B. In the junior and senior years Latin becomes an elective study, except for students who are candidates for honors in Latin; of them it is required.

1. **Livy:** Selections from Books I, XXI and XXII. Roman history. **Tacitus:** Agricola and Germania. **Cicero:** De Senectute or De Amicitia or Selected Letters. Latin composition.

The work of the first year includes a thorough review of forms and syntax through oral and written prose composition and sight reading. Selections from the three great masters of Roman prose are made the basis for grammatical and literary analysis and interpretation, and also, through lectures and assigned reading, for the study of Roman history through the reign of Trajan.

Required of freshmen in the A. B. and Ph. B. courses. Four hours weekly throughout the year.

2. **Terence:** Adelphoe. **Plautus:** Menaechmi or an equivalent. **Horace:** Selected Odes and Epodes. **Catullus:** Selected poems.

Through lectures on ancient comedy and lyric, and by collateral reading, the student is made acquainted with the history of Roman literature under the Republic. The grammatical analysis aims to make familiar the chief characteristics of early and colloquial Latin, and the general economy of poetic diction; the literary interpretation centers chiefly around the influence of Greek life and thought on Roman literature, and the national and personal elements in Latin poetry.

Required of sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

3. **Horace** (Satires and Epistles) and **Juvenal**. **Pliny the Younger** or **Cicero** (Letters), or **Martial** (Epigrams).

This course, through lectures and assigned reading, continues the history of Roman literature under the Empire. A brief introduction to Roman archaeology (with special study of the Forum Romanum) are given, and in connection with the Pliny an outline of the private life of the Romans.

Elective for juniors in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

4. **Lucretius:** Books I and III or V and Selections, with lectures on didactic poetry, the atomic theory, and the philosophic system of Epicurus. The literature of the Empire is illustrated by readings from **Seneca** (Moral Epistles) or **Quintilian** (Book X

on literary criticism) or **Suetonius** (Lives of Julius Caesar and Augustus) or **Martial** (Selected Epigrams).

As this course is not only for those who elect to study Roman life and literature but also for those who may desire to use Latin in teaching or as an instrument in later research work, special assignments are given from authors or inscriptions for practice in editing, or the writing of history from the sources.

Elective for seniors in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

5. Roman Law. When a sufficient number of seniors electing course 4 desire it, the second term in course 4 is devoted to an Introduction to Roman Law, based on the Institutes of Justinian and Robinson's Selections from Roman Law.

In general, subsidiary reading will be recommended. Equivalents may be substituted in the elective programme at any time, and the order of the subjects as given above may be altered in any one of the four years at the discretion of the head of the department.

6. Honor Course. Studies in the life and works of Vergil.

Open to seniors who have complied with the requirements for special honors. Three hours weekly throughout the year.

Modern Languages

PROFESSOR BARNES, ADJUNCT PROFESSOR MARCH,

ASSISTANT PROFESSOR STEWART, MR. PARKER,

MR. ATKINSON, AND MR. WEEKS

These courses have a twofold object, to give the student such control of the language that he may be able to use it as an instrument in study and research, and to open to him another path to general training and culture. They aim to enable him to read modern texts without translation and to give him some facility in the independent use of the language. In the academic courses the literary side of the study is made prominent; in the engineering division emphasis is laid on those phases of the language which are peculiar to technical and scientific writing.

From the beginning the language studied is made so far as possible the language of the class room.

German

1. **Elementary I.** Grammar and reading; drill on inflection and the more usual constructions, with special attention to pronunciation and vocabulary. Bierwirth's Beginning German is used, and portions of Huss's German Reader and Gore's German Science Reader are read, with such other selections as are adapted to the progress of the class.

Required in the B. E. course of freshmen who offer French at entrance. Three hours weekly throughout the year.

1a. **Intermediate I.** Grammar for review and reference; exercises in syntax; practice in writing German. The reading of the class is mainly in Scientific German, but other matter is also read and suitable selections are assigned for outside study and made the basis of tests and themes. In any year the equivalent of at least two of the following scientific works and one of the others will be read:

Wallentin: Grundzüge der Naturlehre

Du Bois-Reymond: Wissenschaftliche Vorträge

Lassar-Cohn: Die Chemie im täglichen Leben

Muller: Die elektrischen Maschinen

Hauß: Lichtenstein; Freytag: Das Nest der Zaunkönige, Soll und Haben; Sudermann: Frau Sorge; Storm: Der Schimmelreiter; Meyer: Das Amulett, Der Heilige.

Required in the B. E. course of freshmen who offer German for entrance. Three hours weekly throughout the year.

1b. **Intermediate III.** First term: (a) Grammar for review and reference, with exercises and drill on syntax; Thomas's Practical German Grammar. (b) Written composition and reproduction, with colloquial practice and work in vocabulary building based on a course in German composition. Second and third terms: Reading and discussion of works selected from the classics, from nineteenth century drama and fiction, and from historical writings. In 1915-16 one or more works from each of at least four of the following groups will be read:

Lessing: Minna von Barnhelm, Emilia Galotti

Goethe: Götz von Berlichingen, Egmont

Schiller: Maria Stuart, Die Jungfrau von Orleans

Freytag: Die Journalisten; Moser: Der Bibliothekar; Ernst: Flachsmann als Erzieher.

Chamisso: Peter Schlemihl; Ludwig: Zwischen Himmel und Erde; Hauff: Lichtenstein; Freytag: Soll und Haben; with others to be assigned for outside reading.

Sybel: Die Erhebung Europas gegen Napoleon; Ranke: Kaiserwahl Karls des V; Freytag: Bilder aus der deutschen Vergangenheit (selections); Schiller: Egmonts Leben und Tod.

Required in the Ph. B. and B. S. courses of freshmen who offer German for entrance. Five hours weekly throughout the year.

Sophomores who offer French for entrance but have also had two years of German take this course in place of German 2.

2. Elementary II. A course in grammar, composition and reading; easy selections in prose and poetry, historical matter, a novel and a play are read; while thorough preparation and careful drill are insisted upon throughout, the amount of reading demanded is considerable. Bierwirth's Beginning German and Hewett's German Reader are used.

Required in the Ph.B. and B.S. courses of sophomores who offer French at entrance. Elective for juniors in the A. B. course. Five hours weekly throughout the year.

Sophomores in the A. B. course take either German 2 or French 2, and may if they wish elect the alternate in their junior year.

3. Intermediate II. First term: (a) Grammar reviewed and continued, with chief attention to the derivation and composition of the several parts of speech, case and verb construction, idioms, and the translation of English into German; Joynes-Meissner German Grammar and Pope's German Composition. (b) Reading and vocabulary study based on Meyer-Försters Karl Heinrich. Second and third terms: Rapid reading of one or more works from each of the following groups:

Schiller: Wilhelm Tell, Historische Skizzen

Goethe: Götz von Berlichingen, Hermann und Dorothea

Sudermann: Frau Sorge, Der Katzensteg

Elective in the A. B., Ph. B. and B. S. courses for juniors who have passed German 2 with a grade of 80 or more, or German 1b with a grade between 70 and 85. Three hours weekly throughout the year.

3a. Advanced II. Course (a) below and one of the others, or parts of two or more of them:

a) Advanced composition (Lange), with short independent essays; studies in words and their uses (Hastings), with some drill on derivations and etymology; journalistic German (Prehn), with sight readings from current newspapers and periodicals.

b) A study of some of the more recent prose literature, especially the novel; works of Storm, Keller, Meyer, Sudermann, and others.

c) A continuation of the classics begun in German 1b; reading and discussion of additional works of Lessing, Schiller and Goethe; Biedermanns Deutsche Bildungszustände im 18. Jahrhundert.

d) An intensive study of Schiller's life and works.

e) A course of reading in nineteenth century drama, with special attention to Kleist, Hebbel, Grillparzer and Hauptmann.

Elective in the Ph. B. and B. S. courses for juniors who have passed German 1b with a grade of 85 or more. Three hours weekly throughout the year.

4. Advanced I. Language and literature.

a) Advanced composition, with independent themes based on the reading of course (c) below.

b) Kochs Geschichte der deutschen Literatur as a handbook, with lectures, and references to other works.

c) A study of the classical period; Lessing, Goethe and Schiller are discussed in this order and chief attention is given to the following works:

Lessing: Emilia Galotti, Nathan der Weise

Goethe: Faust I (with readings on the Faust legend)

Schiller: Maria Stuart, Jungfrau von Orleans, Wallenstein (with this are read selections from Der 30-jährige Krieg)

Elective in the A. B., Ph. B. and B. S. courses for seniors who have passed German 3 with a grade of 80 or German 3a with a

grade between 70 and 85. Three hours weekly throughout the year.

4a. Advanced III. Course (a) below and one of the others, or parts of two or more of them.

a) Advanced composition (Lange, continued), with original themes on subjects connected with the reading of the course.

b) A study of Goethe's life and works, with readings from *Dichtung und Wahrheit*, and the poems; *Egmont* (with this is read Schiller's *Egmonts Leben und Tod*), *Iphigenie auf Tauris*, *Torquato Tasso*; *Faust I*, with readings on the *Faust* legend in literature.

c) A history of German literature, based on Kluges *Geschichte der deutschen National-Literatur*, with assigned studies and parallel readings from an anthology.

d) A course in Middle High German, based on Wright's *Middle High German Primer* as a text book, with supplementary exercises from other sources. This is a one-term course and may in any year be given as a part of the first half-year's work of (c) above.

Elective in the Ph. B. and B. S. courses for seniors who have passed German 3a with a grade of 85 or more. Three hours weekly throughout the year.

French

1. Elementary I. A beginner's course in grammar and reading with special attention to pronunciation, vocabulary, and the common forms and idioms. Aldrich and Foster's *Elementary French* and Super's *Reader* are used, with such other reading as may be suited to the class.

Required in the B. E. course of freshmen who offer German at entrance. Three hours weekly throughout the year.

1a. Intermediate I. This course consists of (a) a rapid review of the elements of grammar, and the study of syntax and composition (Koren's *French Composition* and Armstrong's *French Verb*). (b) Practice in pronouncing and reading French, by means of reading, dictation, and some conversation. (c) Careful translation. In 1915-16 the books read will be:

Daudet: *Tartarin de Tarascon* (Siepmann)

French Short Stories (Buffum) and one or more of the following:

Dumas: *La Tulipe Noire*; Feuillet: *Le Roman d'un Jeune Homme Pauvre*; Hugo: *Hernani*; La Brète: *Mon Oncle et mon Curé*; Labiche et Delacour: *La Cagnotte*; Sand: *La Petite Fadette*.

Required in the B. E. course of freshmen who offer French for entrance. Three hours weekly throughout the year.

1b. Intermediate III. This course is like 1a, but includes a wider range of reading, so as to give a general view of the history of French literature. Among the additional books that are read may be:

Corneille: *Le Cid*; Molière: *l'Avare*; Racine: *Athalie*; Bosquet: *Selections*; Le Sage: *Gil Blas*; Beaumarchais: *Le Barbier de Seville*; and selections from *La Lyre Française* (Masson) and Lanson's *Histoire de la Litterature Française*.

Required in the Ph. B. and B. S. course of freshmen who offer French for entrance. Elective in the A. B. course of juniors who have had two years of French before entrance. Five hours weekly throughout the year.

Sophomores who offer German for entrance but have also had two years of French take this course in place of French 2.

2. Elementary II. A beginner's course in grammar and reading. This course is similar to French 1, but includes more work in composition and reading. Aldrich and Foster's *Elementary French* and Comfort's *Prose Composition* are used. The reading may include:

Halevy: *L'Abbé Constantin*; Sand: *La Mare au Diable*; La Biche et Martin: *Le Voyage de M. Perrichon*.

Required in the Ph. B. and B. S. course of sophomores who offer French at entrance. Elective for juniors in the A. B. course. Five hours weekly throughout the year.

Sophomores in the A. B. course take either French 2 or German 2, and may if they wish elect the alternate in their junior year.

3. Intermediate II. Grammar reviewed; exercises in vocabulary, idioms and the spoken French in connection with Daudet's

Tartarin de Tarascon (Siepmann). This work is followed by composition and reading. Koren's French Composition is used. The books read may be:

Zola: *La Débâcle*; Souvestre: *Un Philosophe sous les Toits*; De Musset: selections.

Elective in the A. B., Ph. B. and B. S. courses for juniors who have passed French 2 satisfactorily, or French 1b with a grade of not less than 80. Three hours weekly throughout the year.

3a. Advanced II. A reading course in nineteenth century literature. Lanson's *Histoire de la Littérature Française* is followed and discussed, and a considerable amount of modern French is read out of class and reported upon. The college library is called into use, and the student should gain some real acquaintance with certain of the modern authors. One hour a week is given to advanced composition, including translations and the writing of themes.

Elective in the Ph. B. and B. S. courses for juniors who have passed French 1b with a grade of 85 or more. Three hours weekly throughout the year.

4. Advanced I. This course is devoted to the study of some of the classics of the seventeenth century. Selected works of Corneille, Racine, Molière, La Fontaine, and Bossuet are read, together with parts of Lanson's *Histoire de la Littérature Française*. One hour a week is devoted to syntax and composition. Armstrong's *French Verb* is used.

Elective in the Ph. B. and B. S. courses for seniors who have passed French 3. Three hours weekly throughout the year.

4a. Advanced III. This course is devoted to the study of Molière, his life, his works, and his age.

Elective in the Ph. B. and B. S. courses for seniors who have passed French 3a satisfactorily. Three hours weekly throughout the year.

Spanish

1. Junior Elective. Grammar and reader; practice and sight translation. Selections from *Gil Blas*, a recent novel and a modern play are read.

Open to juniors in the A. B., Ph. B. and B. S. courses and to seniors in those courses who have not had Spanish in junior year. Three hours weekly throughout the year.

2. **Senior Elective.** Grammar and composition. One or two dramas of the classical period and one or two modern plays are read, together with some works of recent fiction.

Open to seniors in the A. B., Ph. B. and B. S. courses who have had Spanish 1. Two hours weekly throughout the year.

The English Language and Literature

PROFESSOR HALE, ASSISTANT PROFESSOR CHASE, AND MR. ATKINSON

Courses 1, 2, and 3 are required courses as noted. The advanced courses are arranged so as to form the following three electives, each of which is a connected course of study lasting through junior and senior years:

a) The General Elective (comprising courses 4 and 7). This elective is recommended to those students who are not doing special work in the department.

b) The Major Elective (comprising courses 5 and 8).

c) The Special Honor Elective (comprising courses 6 and 9).

A student taking English as a major must take (a) and (b). A student working for special honors must take (c) and either (a) or (b). For any student, however, who wishes both to take English as a major and to work for special honors, an arrangement will be made by which only two courses each year will be required. The subject-matter of the junior and senior courses, as well as the requirements for honors, vary from year to year.

1. **Rhetoric and Composition.** The aim of this course is to train the student in the use of clear and correct English, written and spoken. The work will consist of the study of rhetorical principles and practice in composition. In 1914-15 Slater's Freshman Rhetoric and Woolley's Handbook of Composition were used as text-books. A certain amount of outside reading from English authors is also assigned. Usually, two short themes a week are required, and at intervals of six weeks

longer themes. Each student meets the instructor in personal conferences for advice about his individual work.

Required of freshmen in all courses. Three hours weekly throughout the year in the A. B., Ph. B. and B. S. courses; two hours weekly throughout the year in the B. E. course.

2. Essays. The practice of English composition is carried on throughout the course. As a rule two essays a term are written, which are corrected and criticised in individual conferences with the instructor.

Required of sophomores, juniors and seniors in all courses. The requirement for senior engineers includes but one literary essay.

3. Introduction to English Literature. This is a course of general reading aiming to acquaint the student with some of the masterpieces of English literature, to train him in the habit of careful reading, and to serve as a basis for more advanced study. The program is as follows: In the fall term, for students in the A. B., Ph. B., and B. S. courses, a study of non-dramatic poetry based on Newcomer and Andrews' *Twelve Centuries of English Poetry and Prose*; for students in the B. E. course, essays by Carlyle and Thackeray; in the winter term, three plays of Shakespeare, with collateral reading on Shakespeare and his period; in the spring term, two nineteenth century novels.

Required of sophomores in all courses. Three hours weekly throughout the year in the A. B., Ph. B. and B. S. courses; two hours weekly throughout the year in the B. E. course.

4. Victorian Literature. Certain leading men of letters are studied as representative of the life and thought of their age. In the fall term the reading consists of five or six novels dealing with different phases of contemporary life. Winter term is given to the study of Tennyson, with selections from other poets, and spring term to the study of Emerson, with special reference to the intellectual tendencies of his age in England and America.

Elective for juniors in all courses. Three hours weekly throughout the year.

5. Early English Literature. During the first two terms The

Canterbury Tales are read and as much of Chaucer's other work as time permits. There is a certain amount of linguistic study, which is necessary for an intelligent reading of the text; but the end in view is an understanding of Chaucer's literary skill and his relations to the age in which he lived. In the spring term the work is in simple Anglo-Saxon prose, such as may be found in Bright's Reader.

Elective for juniors in all courses. Three hours weekly throughout the year.

Not offered in 1914-15.

6. A History of Criticism. This course is designed to acquaint the student with the comparative method in the study of literature. The main influences affecting English critical thought in successive periods are pointed out, and the development is traced by means of extended reading in the critical documents themselves. A part of the year is devoted to some more limited topic, such as The Transition from the Neo-Classical to the Romantic School in England. Each student is required to write an essay of considerable length on a special topic suggested by the course.

Elective for juniors in all courses. Three hours weekly throughout the year.

Not offered in 1914-15.

7. Modern English Literature. This course is a study of the literature of the present day; its object is to give the student an idea of modern points of view. In 1913-14 the course dealt with fiction, the drama, and poetry, giving a term to each. The particular subjects were American fiction of 1913, the drama of the last half century, and English narrative poetry of the 19th century. In 1914-15 they will be much the same. In 1915-16 the particular topics may be changed, but the general purpose of the course will be the same as at present.

Elective for Seniors in all courses. Three hours weekly throughout the year.

8. Old English and Historical Grammar. Beowulf is read in the fall term. The rest of the year is devoted to the history of the English language, with especial attention to the phonology

and the relations of Old and Modern English to the other Teutonic languages, the general principles of phonetics and spelling, word formation including inflections, vocabulary including changes of meaning, and syntax.

Elective for seniors who have taken course 5. Three hours weekly throughout the year.

9. The Critical Positions of To-day. This course is a continuation of course 6. It deals more particularly with the schools of criticism of the nineteenth century and with the chief developments in their critical ideas in the literary world to-day. The object of the course, however, is to give a way of looking at literature rather than a knowledge of the history of criticism. The essay written in the course is some original study of an author that may illustrate principles dealt with in the course.

Elective for seniors who have taken course 6. Three hours weekly throughout the year.

Rhetoric and Public Speaking

PROFESSOR MCKEAN

10. Sophomore Orations. The work consists of three distinct parts; (a) the writing of orations under individual criticism; (b) the special preparation of this work for oral presentation, under individual criticism based upon the general principles of public speaking and upon the personal needs of the student; and (c) the delivery of these orations before the class, subject to still further criticism for general instruction.

Required of sophomores in the B. E. course, one hour weekly throughout the year, and of sophomores in the A. B., Ph. B., and B. S. courses, one hour weekly during the winter and spring terms.

11. Junior Orations. The work is like that of course 10, but of an advanced character.

Required of juniors in all courses. One hour weekly throughout the year.

12. Senior Orations. The work is like that of course 10, but of a more advanced character.

Required of seniors in the A. B., Ph. B. and B. S. courses. One hour weekly throughout the year.

13. Argumentation and Debate. The work consists of two distinct parts: (a) the study of the theory of argumentation and debate, pursued by means of recitations, criticisms, discussions and informal lectures, based upon a text-book; and (b) considerable practice in the analysis of subjects for debates, in the preparation of briefs and arguments, and in the more formal debates of the class room.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

14. Advanced Argumentation and Debate. The work is of a more advanced character than that in course 13, and consists principally of class-room debates throughout the year, formally conducted and subject to criticism and discussion.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have completed course 13. Three hours weekly throughout the year.

15. Honors. Special work leading to special honors in this department is offered to seniors who are qualified to pursue it. Two hours weekly throughout the year.

History and Government

PROFESSOR RIPTON AND MR. WALDRON

The work of the department covers three years, beginning with the first term of the sophomore year. The instruction is given by text-book, by lectures, and by library references.

1. Medieval and Modern History. The course begins with a brief study of the Roman Empire and the contribution of the ancient world to modern civilization. Attention is given to events which have had permanent influence upon the historical development of Europe, and to institutions of enduring importance; among these may be named the medieval church, the feudal institutions, the French monarchy, and the English constitution. The course is designed to form a foundation of historical knowledge

which may serve as a preparation for any further study, and to give to the student some acquaintance with methods of historical study and the use of authorities and sources.

Required of sophomores in the A. B., Ph. B. and B. S. courses, and of juniors in the B. E. course, Option B. Three hours weekly throughout the year.

2. American History. A study is made of the period of American discovery and exploration and of the colonial period. The main part of the work, however, begins with an examination of the causes of the American Revolution. The course is guided by text-books and lectures, and much work is done in the library among the sources and authorities.

Elective for seniors and juniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year. Required of juniors in the B. E. courses. Two hours weekly throughout the year.

3. French Revolution and Nineteenth Century. This course considers the causes, ideas and progress of the French Revolution and the reconstruction of European politics and society produced by the revolutionary and Napoleonic wars. Attention is then directed to the development of the spirit of nationality, especially in Italy and Germany, and a careful study is made of the political, economic and social progress of Great Britain and the continental states. The course is designed to give a clear understanding of conditions in Europe to-day and the historical processes by which they were brought about.

Elective for juniors and seniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

4. Comparative Politics. (Assistant Professor Hill) A comparative study is made of the constitutions and governments of England, the United States, and the principal nations of continental Europe. Sufficient attention is given to historical origins to account for characteristic differences, but the work consists mainly of a systematic study of the constitutions, their adoption and methods of amendment, the distribution of governmental powers, and their practical operation, including some account of

political parties. The course concludes with a study of the principles of International Law.

Elective for Seniors in the A. B., Ph. B. and B. S. courses. Required of Seniors in the B. E. course, Option B. Three hours weekly throughout the year.

5. Honors. A course in History or International Law is offered to candidates for special honors in history. Senior year, three hours weekly.

Philosophy

PROFESSOR HOFFMAN

The courses in this department begin with the first term of the junior year and extend through the entire senior year. Logic, elementary psychology and elementary ethics come in the junior year. The more advanced courses, with special studies in philosophy, are taken up in the senior year. Instruction in the various studies of the department is usually given by means of lectures, discussions, and the use of a text-book.

1. Logic. This study is confined to the simple elements of the science. As soon as the rules of correct thinking are mastered, the student is put at once to the analysis of arguments, the chief purpose of the study being to develop skill in detecting fallacies. Extracts from many authors are brought before the class for criticism, and so far as possible they are taken from every field of thought.

Elective for juniors, in the A. B., Ph. B. and B. S. courses; open to seniors in the B. E. course, electrical division. Three hours weekly during the first term.

2. Elementary Psychology. This course is designed to acquaint the student with the most obvious facts of his mental experience; and the attempt is made to classify these facts into a system. The relation of psychology to the other sciences is set forth, and the importance of the study is emphasized in that it lays the foundation for all the sciences of man as a political, moral and religious being.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second term.

3. Elementary Ethics. Only the outlines of the subject are presented in this course. The ordinary duties of man are pointed out by first describing those concerning himself and those that arise from his relation to others, to nature, and to God.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during third term.

4. Advanced Psychology. The chief problems discussed in this course are the recent views concerning the nature of perception, the localization of functions and the theories concerning memory, conception, the emotions and the will. The facts of abnormal psychology are also here considered, especially insanity, dreams, hypnotism, telepathy, and the hypothesis of a secondary self.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during first term.

5. Advanced Ethics. Some account of the history of ethics is given in this course, and present ethical theories are stated and discussed. The relation of ethics to other sciences is emphasized and much attention is given to the ethical problems involved in such questions as education, taxation, transportation, corporations, the treatment of criminals, the care of the poor, and the formation and dissolution of the family.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during second term.

6. Evolution of Religion. The object of this course is to show how religion originates and to trace out the steps taken in its development. The chief ideas of the leading religions of the heathen world are critically examined, their excellencies and defects are pointed out, and a comparison of them is made with the special doctrines of the Christian system.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during third term.

7. History of Philosophy. The attempt is made in this course

to go over with considerable detail the general field of philosophy from the earliest times down to the present day. In this way the views of the principal thinkers of the world are presented and discussed upon a great variety of problems, such as the validity of knowledge, the nature of virtue, the foundations of the State and the existence of God. Much is made in this course of the historical connection of the different systems for the purpose of impressing upon the mind of the student the successive steps that have been taken in the actual development of thought.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

8. Honors. Advanced courses leading to special honors in this department are offered to those students who are qualified to pursue them.

Economics and Sociology

ASSISTANT PROFESSOR HILL

1. Elements of Economics. A survey and descriptive study of economic life is made the foundation in this course, following which there is an examination of the principles of consumption, production, exchange and distribution. This requires two terms of work, following which, in the third term, special economic problems are more carefully and intensively considered.

Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses who have had history 1.

2. Elements of Economics. This course is designed particularly for engineering students and includes a brief descriptive survey of economic life and an examination of some fundamental economic principles in relation to modern industry.

Required of seniors in the E. E., S. E., and G. E., option A., courses. Three hours weekly during the first term.

3. Economic History of the United States. This course includes a study of the industrial and commercial development of the country and an examination of industrial, commercial and

financial policies at various periods. The student thus becomes familiar with the chief problems of our national life, both at home and abroad.

Elective for seniors in the A. B., Ph. B. and B. S. courses. who have had economics 1. Three hours weekly during the first term.

4. Money and Banking. This course outlines briefly the general problems of money and banking, including a study of principles and practice.

Elective for seniors in the A. B., Ph. B. and B. S. courses. who have had economics 1 and 3. Three hours weekly during the second term.

5. Public Finance. The student becomes acquainted, in this course, with theory and principles of public finance. He also examines policies relating to public revenues and expenditures.

Elective for seniors in the A. B., Ph. B. and B. S. courses. who have had economics 1, 3 and 4. Three hours weekly during the third term.

6. Elementary Sociology. In this descriptive and analytical course on social phenomena the student becomes familiar with the general characteristics and principles of human association and social activity.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the first and second terms.

7. Charities and Corrections. A study is made of the facts and causes of poverty, crime, degeneracy and dependency. The proper treatment of dependents and delinquents is considered especially in relation to public welfare.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the third term.

8. Honors. Advanced courses leading to special honors in economics are offered to seniors in the A. B., Ph. B. and B. S. courses who are qualified to pursue them.

Mathematics

PROFESSOR GARIS, ASSISTANT PROFESSOR GARRISON, MR. MAXON,
MR. HUNTLEY, AND MR. HAGAR

The following courses are given:

1. Freshman Mathematics.

a) Solid Geometry. In this course a large number of problems and original exercises are given in addition to the formal propositions.

b) Higher Algebra. This course begins with a review of the more important operations of elementary and intermediate algebra. It includes determinants, series, and theory of equations.

c) Plane Trigonometry. This course includes the theory of plane trigonometry; the solution of triangles; trigonometric equations and identities; De Moivre's theorem, and simple applications.

Required of freshmen in the A. B. and Ph. B. courses. Four hours weekly throughout the year.

2. Freshman Mathematics.

a) Plane Trigonometry. For description of course see 1c.

b) Higher Algebra. For description of course see 1b.

c) Analytical Geometry. This course includes plane and solid analytical geometry and the more important higher plane curves. It aims to show the association of algebra with geometric representation. The calculus method of finding the slope of a conic section is given in addition to the direct geometric method. Simple applications to mechanics and physics are given.

Required of freshmen in the B. S. and B. E. courses. Five hours weekly throughout the year.

3. Analytical Geometry. For description of course see 2c.

Optional for sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

4. Differential and Integral Calculus. This course includes drill in differentiation and integration; the application of derivatives to curves; maxima and minima; the development of series; problems involving rates, curvature, surfaces and volumes; and the application of calculus to problems in mechanics and physics.

Required of sophomores in the B. S. and B. E. courses and elective for juniors in the A. B. and Ph. B. courses who have had course 3. Three hours weekly throughout the year.

5. Differential Equations. The greater part of this course is given to the treatment of ordinary differential equations and their applications to geometry, electricity, physics and mechanics. A review of the calculus, especially methods of integration, is required.

Required of juniors in the E. E. course and elective for juniors in the B. S. course and seniors in the A. B. and Ph. B. courses who have had course 4. Three hours weekly throughout the year.

6. Advanced Calculus. This course continues the study of partial differential equations with applications. The other subjects treated will be changed from year to year.

Elective for seniors in the B. S. and E. E. courses who have had course 5. Three hours weekly throughout the year.

7. Engineering Mathematics. This course gives a review of the algebra, trigonometry, analytical geometry, calculus and analytical mechanics, required of civil and sanitary engineers during the first three years, showing the logical connection of the several subjects and their application to engineering problems.

Required of seniors in the C. E. and S. E. courses. Two hours weekly during the first and second terms.

8. Least Squares. This course treats of the fundamental principles and processes of the method of least squares, and their application to the solution of astronomical, physical and engineering problems.

Required of seniors in the C. E. course, option A. Two hours weekly during the second terms.

9. Honors. Candidates will be given advanced work in various subjects suited to their special ability.

Open to seniors in the A. B., Ph. B., and B. S. courses who have an average of 90 per cent. in their mathematical studies of the first three years. Three hours weekly throughout the year.

Mechanics and Physics

PROFESSOR OPDYKE AND ASSISTANT PROFESSOR VEDDER

For students in the A. B., Ph. B. and B. S. courses, the work in mechanics and physics is elective and may be continued through the junior and senior years. A course in general physics, consisting of lectures and recitations, is accompanied or followed by one in laboratory work. The student may then take a course in mathematical physics, including one term of general astronomy; and this may be supplemented by a course leading to special honors.

For students in the B. E. course, the work in physics is required throughout the sophomore year; but a B. E. student, upon special vote of the faculty and in case his schedule of hours allows it, may elect physics as an extra subject during his junior and senior years. See courses 3, 4 and 5.

The collection of apparatus for the illustration of lectures is extensive. It has been secured largely from foreign makers and includes sets of standard pattern by Koenig, Duboscq, Ruhmkorff and others.

The courses in detail are as follows:

1. General Physics. This course is intended to give a general presentation of the facts and laws of physics. Experimental lectures, recitations and discussions aim to make the student familiar with the chief phenomena of the subject and their explanation.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

2. Laboratory Work. This course is open to those who are taking physics I or who have taken it, and who have taken mathematics 2c or 3. It consists of individual work by the students themselves in the laboratory, supplemented by lectures on some of the mathematical aspects of the subject omitted in 1. The experiments performed are such as allow accurate measurement of the quantities involved; and the results obtained are used to verify some general law, or to obtain some physical constant of nature.

Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses. Two laboratory periods and one lecture period weekly throughout the year.

1a. General Physics for Engineers. This course treats the subject more mathematically than 1, and is given to students in the engineering course. The calculus is used, more especially during the second and third terms. Assuming some knowledge of the fundamental facts of physics, attention is paid to the discussion of the phenomena and their mathematical analysis, in so far as this is possible with the use of the more elementary analytical methods. The work consists of lectures, recitations and laboratory practice.

Required of sophomores in the B. E. course. Three, three and two classroom hours weekly during the first, second and third terms, respectively; and one laboratory period weekly throughout the year.

1b. General Physics M. This course is similar to but less extensive than physics 1 and 2 combined. It requires no mathematics beyond that required for admission to the B. S. course and is intended for students in the one year course offered by the college in preparation for admission to the medical department of the university.

Required in the pre-medical course. Two classroom hours and two laboratory periods weekly throughout the year.

3. Mathematical Physics. This course is open to those who have taken physics 2 and mathematics 5, and aims to carry out and complete the mathematical discussion of some parts of the subject. A good knowledge of calculus is required, and an elementary knowledge of differential equations. Some time is devoted to a further study of differential equations as applied to physical problems, and through lectures and assignments of reading the student is introduced to more advanced work.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have taken course 2, and open to juniors and seniors in the B. E. course, upon special vote of the faculty. Three hours weekly

during the first and second terms. This course and course 4 are intended to be elected together.

4. Spherical Trigonometry and Astronomy. A short course in astronomy is given, beginning with the study of spherical trigonometry. The course is general in character, including some reference to the simpler mechanical aspects of the subject.

Elective for seniors who have taken course 3; required of juniors in the general engineering course, Option A, and in the sanitary engineering course; and open to other engineering students of the junior and senior classes, upon special vote of the faculty. Three hours a week during the third term.

5. Honors. Candidates for special honors in physics must complete all the regular work of the department and must pursue, in addition, a special course in advanced mechanics and physics three hours a week throughout the senior year, and must submit theses.

Chemistry

PROFESSOR ELLERY, MR. SALATHE, AND MR. VOSBURGH

The object of instruction in this department is to develop power of accurate observation and logical reasoning, and habits of careful work. Students who are planning special courses in chemistry, medicine, biology, geology, or other branches of natural science, will find the courses of great value. The laboratory facilities are convenient, the apparatus and chemicals are the best, and the chemical library contains recent books on various branches of the science.

1. General Chemistry. The course includes an exhaustive study of the non-metals and their compounds, together with the fundamental laws and theories of chemistry, a special study of the common metals, and a brief introduction to organic chemistry. Laboratory practice in the fall and winter terms is strictly quantitative, and in the spring term includes simpler methods of qualitative analysis involving the recognition of single metals and acid radicals in solution.

Required of sophomores in the B. E. course. Two recitations

and one laboratory period weekly during the fall term; three recitations and one laboratory period weekly during the winter and spring terms.

1a. General Chemistry. This course is similar to course 1, in that it includes the study of metals and non-metals, theories and laws, but analytical work in the laboratory is limited to recognition of acid radicals in solution.

Required of freshmen in the B. S. course. Elective for juniors and seniors in the A. B. and Ph. B. courses. Two recitations and one laboratory period weekly throughout the year.

2. Descriptive Chemistry. This course covers a more exhaustive study of the metals than course 1, and acquaints the student with some of the applications of chemistry to engineering problems. The laboratory work comprises systematic examination of complex mixtures, particularly of those materials which are of especial interest to engineers.

Required of juniors in the B. E. course. Two recitations and two laboratory periods weekly during the fall term.

2a. Qualitative Analysis. A study of the reactions of bases and acids in solution, a course in blowpipe analysis, a systematic examination of complex solutions of metals and acids, and of complex solids.

Optional for sophomores in the B. S. course. Elective for seniors in the A. B. and Ph. B. courses, who have had course 1a. Three laboratory periods weekly throughout the year.

3. Quantitative Analysis. In this course the student becomes familiar with various gravimetric and volumetric methods of analysis.

Elective for juniors in the B. S. course who have had course 2a. Three hours weekly throughout the year.

Students who elect quantitative analysis will be expected to elect course 1, general physics.

4. Organic Chemistry. This course comprises analysis of organic compounds, the preparation of typical organic substances, and a thorough study of the principles and theories of organic chemistry

In addition to the analysis of organic compounds, students in this course will have opportunity to make molecular weight determinations by the vapor density method, and the boiling and freezing point method. They will also have opportunity to study the effects of electrolysis on typical organic compounds.

Elective for seniors in the B. S. course who have had course 3. Three hours weekly throughout the year.

Students who elect organic chemistry will be expected to elect course 1, general biology, if they have not already pursued that course in their junior year.

5. Sanitary Chemistry. This course includes a limited study of quantitative methods, a thorough course in water analysis, and a short course in milk analysis.

Required of seniors in the sanitary engineering course. Two hours weekly during the fall and winter terms.

6. Honors. Students who have done satisfactory work in courses 1 and 2a, and who desire to emphasize chemistry in their college course, will be eligible for honors in the department. Such students will be required to do six credit hours of work in each of the junior and senior years and, at the close of the senior year, to pass an examination covering all the four years work. The time in the junior year will be given, in the fall and winter terms, to quantitative analysis, and in the spring term to working out some original problem involving analytical methods. In the senior year the work will include the regular course in organic chemistry, a course in physical chemistry, and reading of assigned works on general and industrial chemistry. At some time during the senior year the candidate will be expected to present a thesis describing his original work.

Biology and Geology

PROFESSOR STOLLER AND MR. ABBEY

1. General Biology. In this course, after an introductory study of cells and tissues, a series of types of plants and animals is studied with reference to structure, function and development. It is intended to make the work a discipline in the method of scien-

tific study and to afford the student a knowledge of the broader facts and principles of biological science in their general philosophical values. Laboratory work, lectures and recitations, counting as a three-hour course.

Alternative with mathematics for sophomores in the B. S. course. Three hours weekly throughout the year.

2. Biology and Geology. This course is intended to afford a general knowledge of these sciences as branches of liberal culture. The treatment is general and philosophical rather than technical but constant use is made of illustrative material. The course includes a consideration of the scientific evidences of organic evolution and the theories of evolution of various authors.

Alternative with mathematics for sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

3. Sanitary Biology. This is a descriptive course treating of bacteria as a group of organisms and especially of the applications of bacteriology in sanitation. Demonstrations of microscopic preparations and of culture methods in the examination of water and milk are given. Recitations and lectures, with demonstrations.

Required of seniors in the sanitary engineering course and in option A of the general engineering course. Two hours weekly during the second term.

4. Animal Morphology. This course is adapted for students who wish a somewhat advanced knowledge and training in biology, especially as a preparation for the medical profession. The work is mainly in the line of comparative anatomy and embryology and includes the dissection of several vertebrate types, including a mammal, in detail.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

5. Pre-Medical Biology. This course has been arranged to meet the requirement of the medical department of Union University, see page 29. The work consists of laboratory work in

anatomy, histology and embryology and of a text-book course in biology, together counting as a four-hour course.

Required of freshmen in the one-year pre-medical course.

6. Mineralogy and Geology. This course consists largely of laboratory and field work. It begins with the determination of common minerals and rocks. Physiographic and structural geology are studied on the basis of the topographic maps and folios of the United States survey and of the New York state geological survey. Along with the practical work a text-book course in general geology is given.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

Students electing this course are required to take as a collateral science course the course in general physics.

7. Economic Geology. In this course after an introductory study of the principles of structural geology the work is related to the occurrence and distribution in the United States of building stones and materials, mineral ores, coal and other economic products.

Required of seniors in the B. E. courses, general and sanitary divisions. Two hours weekly during the first term.

8. Glacial Geology. Honor Course. A detailed study of the the deposits of the Pleistocene period as occurring in the region of the lower Mohawk valley and the interpretation of the conditions under which they were laid down. Also a general study of the glacial period of geological history. This course includes at least 60 hours of field work.

Open to seniors in the A. B., Ph. B. and B. S. courses who have had courses 1 (or 2) and 6.

Physiology and Physical Training

DR. MCCOMBER

Physical training and the study of human anatomy, physiology, and hygiene are required in all courses. The work consists of recitations and lectures, demonstrated by means of the microscope, the manikin and the human skeleton. An attempt is made to give a practical course covering the essential facts of the

subject with the idea of arousing in every student a genuine self interest, of developing a wholesome self respect without overwhelming him with the mass of details that must be considered in a close study of anatomy.

The course in hygiene is designed to acquaint the student with practical laws concerning the preservation of health and to impress upon his mind the dependence of health upon the consistent observance of such laws. Lectures on first aid to the injured, bacteriology, contagious and infectious diseases and social purity form a part of the course.

It is the aim of the department to give the student such a training in the methods of physical education that he may have a comprehensive knowledge of the subject, and to secure health, vigor and such harmonious development of the body as will fit it to resist disease, and prepare it for efficient service, both now and later in life.

Work in the gymnasium is required of freshmen only, but the organization of voluntary classes makes it possible for all to secure the advantages of systematic exercise. The course in the gymnasium is so arranged as to give a knowledge of the different kinds of apparatus pertaining to physical training. Commencing with light work, consisting of free gymnastics, club, dumb-bell and wand exercises, the course leads through a graded series, involving heavier work as the student becomes fitted for it.

Swimming is a regular part of the course in gymnastics and all freshmen are expected to acquire a reasonable proficiency in it.

Freshmen are required to pass an examination in gymnastics at the end of the winter term, credit being based upon actual proficiency in the various exercises as indicated by such examination.

A physical examination of new students is made at the beginning of the year and corrective exercises are prescribed for the remedy of physical defects. Charts of the physical measurements showing the comparison of the individual with the normal development and hand books containing much valuable hygienic data are furnished upon payment of a small fee. All candidates for college teams are required to pass a satisfactory physical

examination before they are allowed to compete in athletic contests.

It is the policy of the department to influence the entire student body to take an active part in athletic sports and gymnastics and not to cater to the exceptional athlete to the exclusion of those who are physically less perfectly equipped.

1. Physiology and Hygiene.

Required of freshmen in all courses. Two periods weekly during the first and third terms; of freshmen in the academic courses only, two periods weekly during the second term.

2. Gymnasium.

Required of freshmen in the academic courses. Two periods weekly during the second and third terms.

2a. Gymnasium.

Required of freshmen in the engineering courses. Two periods weekly during the second term.

Special Lectures

It is the policy of the college to provide its students with the advantages of frequent lectures by specialists in the various departments of knowledge.

In endowing the Ichabod Spencer Professorship in Philosophy, Mrs. Katherine Spencer Leavitt set aside the sum of \$25,000 to establish a lectureship in memory of her father, the Reverend Ichabod Spencer, D.D., of the class of 1822, to be known as the Ichabod Spencer Lectureship in Psychology.

These lectures are given by distinguished scholars in this department, each year's course being published in book form.

Religious Life

Religious life among the students is cared for through the agency of the Union College Christian Association. This work is under the special care of a secretary who devotes his time to the religious interests of the students. Vesper services are held every Sunday afternoon throughout the year and eminent speakers are secured to conduct these services.

The Literary Societies

The Philomathean Society, founded in 1793, about two years prior to the founding of the college, and the Adelpic Society, founded in 1796, invite to membership all students specially interested in debating. The societies hold frequent meetings during the autumn and winter months for the discussion of current, social and political questions. A joint debate is held in December in competition for the Allison-Foote prizes, page 139.

Library

The library occupies Nott Memorial Hall. It contains forty thousand volumes, and includes the engineering and scientific library of the late Professor Gillespie, the collection of mathematical works made by the late John Patterson, of Albany; the library of the late Hon. Henry J. Cullen, of the class of 1860, and the library of ancient and classical languages and literatures of the late Professor Tayler Lewis. The income from a bequest of five thousand dollars left by the late Lemon Thomson, Esq., of Albany, of the class of 1850, is devoted to the purchase of books on American subjects, especially history and political science. An alcove, known as the Thomson Alcove, is reserved for these books. By the will of the late Rev. Oscar Blakeslee Hitchcock, of the class of 1852, a bequest of upwards of thirty thousand dollars was left to the college for the purchase of books, manuscripts, etc. A most important accession is the Croes Engineering Library, the gift of Mr. Edgar Beach Van Winkle of the class of 1860. This section of the library is in the General Engineering Building for the use of the engineering department of the college. The library is classified according to the Dewey decimal system and a dictionary card catalogue, on the Dewey plan, is now being prepared.

One hundred and fifteen periodicals and the transactions of many learned societies are received.

Library Rules.

Hours: 8-1; 2-6; 7:30-9 from Monday to Friday. 8-1; 7:30-9 on Saturday.

The library will be closed on Sundays and legal holidays.

The library will be open during vacation at hours to be announced.

Loan of books: Reference, Cullen and valuable books are not to be loaned.

Reserved books may be loaned over night, i. e., from 9 p. m. to 8 a. m. There will be a fine of \$1.00 per day or part of a day for each reserved book overdue.

Periodicals are regarded as reference books.

All other books may be loaned, not more than two at a time, for a period of two weeks, and may be once renewed, unless called for. A fine of ten cents per day will be charged for all books overdue, and all library privileges will be withdrawn until the book is returned and the fine paid.

The Natural History Museum

PROFESSOR STOLLER, CURATOR

The Wheatley collection of minerals, presented to the college in 1858, by E. C. Delavan, Esq., contains 4,000 specimens, many of which represent the more valuable forms. This collection has recently been carefully inspected by Dr. D. S. Martin of New York city. All of the specimens have been re-identified and the entire collection has been re-arranged and placed in order for exhibition and for study.

In geology there is a general collection of rocks and minerals, and a considerable collection of the paleozoic rocks and fossils of the New York formations.

In zoology the collection of mounted birds numbers 311 specimens, representing 161 species of the bird fauna of the eastern United States. These have recently been carefully inspected, and re-labelled. Fishes, amphibia and reptiles, especially of the local fauna, are represented by specimens in alcohol. In the department of invertebrates the collections of marine animals made by Dr. Harrison E. Webster are extensive, including sponges, corals, worms, crustacea and mollusks, the total number of species represented being over 5,000. The Wheatley collection of shells, presented by E. C. Delavan, Esq., consists of 8,000 specimens.

The botanical collections include a nearly complete set of local flowering plants, the work of Professor Jonathan Pearson. To this there has since been added a complete set of the ferns and fern allies of Schenectady county. The herbarium also includes a considerable number of foreign plants, including representative collections from Germany, Spain, Asia Minor and England, as well as some specimens from Iceland, Norway, France and Switzerland. They have been sorted and distributed in a single series following the latest accepted sequence, that of Engler and Prantl's *Natürliche Pflanzenfamilien*, making the entire collection of some 8,000 or 10,000 specimens readily accessible for reference and study.

The museum is open to the public on Wednesday afternoon and Saturday morning. Visitors may be admitted at other times by making application to the college librarian.

CURRICULA OF ACADEMIC COURSES

The numeral after a subject refers to the course as described in the departmental statement; the number in parenthesis refers to the page where the statement is given. The hours show the time given the subject each week in the class room.

Course leading to Degree of A.B.

Freshman Year

Greek 1.....(42).....	4 hours
Latin 1.....(44).....	4 hours
English 1.....(52).....	3 hours
Mathematics 1.....(62).....	4 hours
Physiology and Hygiene 1....(72).....	2 hours

Total 17 hours

In the second and third terms one credit hour is required in Gymnastics

Sophomore Year

Greek 2 and Ancient History .(43).....	4 hours
Latin 2.....(44).....	3 hours
English 3.....(53).....	3 hours
German 2.....(47).....	5 hours
or	
French 2.....(50).....	5 hours
Mathematics 3.....(62).....	3 hours
or	
Biology and Geology 2.....(69).....	3 hours

Total 18 hours

Junior Year

Rhetoric 11.....(55).....	1 hour
Electives.....(81).....	15 hours

Total 16 hours

Senior Year

Rhetoric 12.....(55).....	1 hour
Electives.....(82).....	15 hours

Total 16 hours

Course leading to Degree of Ph.B.

Freshman Year

Latin 1.....(44).....	4 hours
German 1b.....(46).....	5 hours
or	
French 1b.....(50).....	5 hours

English 1.....(52).....	3 hours
Mathematics 1.....(62).....	4 hours
Physiology and Hygiene 1....(72).....	2 hours
Total 18 hours	

In the second and third terms one credit hour is required in Gymnastics.

Sophomore Year

Latin 2.....(44).....	3 hours
German 2.....(47).....	5 hours
or.	
French 2.....(50).....	5 hours
English 3.....(53).....	3 hours
History 1.....(56).....	4 hours
Mathematics 3.....(62).....	3 hours
or	
Biology and Geology 2.....(69).....	3 hours
Total 18 hours	

Junior Year

Rhetoric 11.....(55).....	1 hour
Electives.....(81).....	15 hours
Total 16 hours	

Senior Year

Rhetoric 12.....(55).....	1 hour
Electives.....(82).....	15 hours
Total 16 hours	

Course leading to Degree of B.S.

Freshman Year

German 1b*.....(46).....	5 hours
or	
French 1b.....(50).....	5 hours
English 1.....(52).....	3 hours
Mathematics 2.....(62).....	5 hours
Chemistry 1a.....(67).....	3 hours
Physiology and Hygiene 1....(72).....	2 hours
Total 18 hours	

In the second and third terms one credit hour is required in Gymnastics.

* Students who offer Latin for entrance take Latin 1 in place of German or French.

Sophomore Year

German 2.....(47).....	5 hours
or	
French 2.....(50).....	5 hours
English 3.....(53).....	3 hours

History 1.....	(56).....	4 hours
Mathematics 4.....	(62).....	3 hours
Chemistry 2a.....	(67).....	3 hours
or		
Biology 1.....	(68).....	3 hours
		<u>Total 18 hours</u>

Junior Year

Rhetoric 11.....	(55).....	1 hour
Electives.....	(81).....	15 hours
		<u>Total 16 hours</u>

Students who offer Latin for entrance must elect German 3 or French 3.

Senior Year

Rhetoric 12.....	(55).....	1 hour
Electives.....	(82).....	15 hours
		<u>Total 16 hours</u>

The list of electives is given in full with the schedule time of each on pages 81-83. The general conditions governing the choice of electives are stated on page 81. The detailed outline of work in each subject and any restrictions limiting its election are given under the departmental statements on pages 42-72.

Pre-Medical Course

This course is offered to meet the requirements for admission to the Medical Department of Union University in accordance with recommendations of the American Medical Association.

Physics 1b.....	(65).....	4 hours
Biology 5.....	(69).....	4 hours
Chemistry 1a.....	(67).....	4 hours
German 1b.....	(46).....	5 hours
or		
French 1b.....	(50).....	5 hours
		<u>Total 17 hours</u>

In the second and third terms one credit hour is required in gymnastics.

SCHEDULE OF REQUIRED STUDIES IN THE ACADEMIC COURSES

Freshman Year

A. B. Course

Greek, 4 hours.....	T., W., Th., S., 9-10
Latin, 4 hours.....	M., W., F., S., 11-12
English, 3 hours.....	M., W., F., 8-9
Mathematics, 4 hours.....	M., T., Th., F., 1:30-2:30
Physiology and Hygiene, 2 hours.....	T., Th., 8-9

Ph. B. Course

Latin, 4 hours.....	M., W., F., S., 11-12
German, 5 hours.....	M., T., W., F., S., 9-10
or	
French, 5 hours	M., T., W., F., S., 9-10
English, 3 hours.....	M., W., F., 8-9
Mathematics, 4 hours.....	M., T., Th., F., 1:30-2:30
Physiology and Hygiene, 2 hours.....	T., Th., 8-9

B. S. Course

German, 5 hours.....	M., T., W., F., S., 9-10
or	
French, 5 hours.....	M., T., W., F., S., 9-10
or	
Latin I, 4 hours.....	M., W., F., S., 11-12
English, 3 hours	M., W., F., 8-9
Mathematics, 5 hours.....	M., W., Th., F., S., 10-11
Chemistry, 3 hours.....	T., Th., 11-12; F., 1:30-3:30
Physiology and Hygiene, 2 hours.....	T., Th., 8-9

Sophomore Year

A. B. Course

Greek, 4 hours.....	M., T., Th., S., 10-11
Latin, 3 hours.....	M., W., F., 9-10
English, 3 hours.....	T., Th., S., 8-9
German, 5 hours.....	T., W., Th., F., S., 11-12
or	
French, 5 hours.....	T., W., Th., F., S., 11-12
Mathematics, 3 hours.....	M., W., F., 8-9
or	
Biology and Geology, 3 hours.....	M., W., F., 8-9

Ph. B. Course

Latin, 3 hours.....	M., W., F., 9-10
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German, 5 hours.....	T., W., Th., F., S., 11-12
or	
French, 5 hours.....	T., W., Th., F., S., 11-12
English, 3 hours.....	T., Th., S., 8-9
History, 4 hours.....	M., T., Th., S., 10-11
Mathematics, 3 hours.....	M., W., F., 8-9
or	
Biology and Geology, 3 hours.....	M., W., F., 8-9

B. S. Course

German, 5 hours.....	T., W., Th., F., S., 11-12
or	
French, 5 hours.....	T., W., Th., F., S., 11-12
English, 3 hours.....	T., Th., S., 8-9
History, 4 hours.....	M., T., Th., S., 10-11
Mathematics, 3 hours.....	M., W., F., 9-10
Chemistry, 3 hours.....	M., W., 1:30-4:30
or	
Biology, 3 hours.....	M., W., 1:30-2:30 F., 1:30-3:30

Junior Year

All Courses

Rhetoric, 1 hour.....	F., 4:30-5:30
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Students who enter the B.S. course on Latin must elect French 3 or German 3 in their junior year.

Senior Year

All Courses

Rhetoric, 1 hour.....	F., 3:30-4:30
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For statement of work in each subject see pages 42-72

SCHEDULE OF JUNIOR AND SENIOR ELECTIVES

A total of fifteen hours is required.

Each student is required to choose two electives to be continued for two years, one of which must be the continuation of a subject previously pursued in college.

Any student in the Ph. B. course may take the A. B. degree if he elects Greek for five hours in the junior and senior years.

The head of a department may direct the choice of electives in other departments, for honor students, to the number of six hours in each year.

Subjects that conflict have been placed in the same group.

Junior Groups

For limiting conditions, see statements of respective departments.

Group I

French 3, 3 hours.....	M., W., F., 8-9
German 3a, 3 hours.....	M., W., F., 8-9
Greek 5, 3 hours.....	M., W., F., 8-9

Group II

Mineralogy, 3 hours.....	T., Th., S., 8-10
German 3, 3 hours.....	T., Th., S., 8-9
French 3a, 3 hours.....	T., Th., S., 8-9

Group III

Mathematics 4, 3 hours.....	M., W., F., 9-10
English 4, 3 hours.....	M., W., F., 9-10

Group IV

Latin, 3 hours.....	T., Th., S., 9-10
Mathematics 5, 3 hours.....	T., Th., S., 9-10
Mineralogy 7, 3 hours.....	T., Th., S., 8-10

Group V

Economics, 3 hours.....	M., W., F., 10-11
Physics, 3 hours.....	M., W., F., 10-11

Group VI

Argumentation, 3 hours.....	T., Th., S., 10-11
English 5, 3 hours.....	T., Th., S., 10-11

Group VII

European History, 3 hours.....M., W., F., 11-12

Group VIII

Logic, Psychology and Ethics, 3 hours.....T., Th., S., 11-12
 General Chemistry, 3 hours.....T., Th., 11-12; F., 1:30-3:30

Group IX

Qualitative Analysis, 3 hours.....M., W., 1:30-4:30
 Laboratory Physics, 3 hours.....M., 1:30-2:30; W., F., 1:30-3:30
 General Chemistry, 3 hours.....T., Th., 11-12; F., 1:30-3:30
 Spanish, 3 hours.....M., W., F., 1:30-2:30
 Greek, 5 hours.....M., T., W., Th., F., 2:30-3:30

Group X

Quantitative Analysis, 3 hours.....T., Th., 1:30-4:30
 Greek, 5 hours.....M., T., W., Th., F., 2:30-3:30

Senior Groups

For limiting conditions, see statements of respective departments.

Group I

American History, 3 hours.....M., W., F., 8-9
 German 4, 3 hours.....M., W., F., 8-9
 French 4a, 3 hours.....M., W., F., 8-9

Group II

German 4a, 3 hours.....T., Th., S., 8-9
 French 4, 3 hours.....T., Th., S., 8-9
 Greek 7, 3 hours.....T., Th., S., 8-9
 Constitutional History, 3 hours.....T., Th., S., 8-9

Group III

Economics, 3 hours.....M., W., F., 9-10
 Advanced Argumentation, 3 hours.....M., W., F., 9-10

Group IV

Mathematics 5, 3 hours.....T., Th., S., 9-10
 English 7, 3 hours.....T., Th., S., 9-10
 Advanced Psychology (first term), 3 hours.....T., Th., S., 9-10
 Advanced Ethics (second term), 3 hours.....T., Th., S., 9-10
 Evolution of Religion (third term), 3 hours....T., Th., S., 9-10

Group V

Latin, 3 hours.....	M., W., F., 10-11
Mathematics 8, 3 hours.....	M., W., F., 10-11
English 9, 3 hours.....	M., W., F., 10-11

Group VI

Mathematics 9, 3 hours.....	T., Th., S., 10-11
Latin 6, 3 hours.....	T., Th., S., 10-11
Sociology, 3 hours.....	T., Th., S., 10-11

Group VII

Physics 5, 3 hours.....	M., W., F., 11-12
History of Philosophy, 3 hours.....	M., W., F., 11-12
Greek 9, 3 hours.....	M., W., F., 11-12

Group VIII

Comparative Politics, 3 hours.....	T., Th., S., 11-12
Mathematical Physics, 3 hours.....	T., Th., S., 11-12

Group IX

Qualitative Analysis, 3 hours.....	M., W., 1:30-4:30
Organic Chemistry, 3 hours.....	M., W., 1:30-4:30
Laboratory Physics, 3 hours....	M., 1:30-2:30; W., F., 1:30-3:30
Greek 8, 5 hours.....	M., T., W., Th., F., 1:30-2:30
History of Education, 3 hours.....	M., W., F., 2:30-3:30
Spanish, 3 hours.....	M., W., F., 2:30-3:30

Group X

Quantitative Analysis, 3 hours.....	T., Th., 1:30-4:30
Animal Morphology, 3 hours.....	T., Th., 1:30-4:30
Greek 8, 5 hours.....	M., T., W., Th., F., 1:30-2:30
Rhetoric and Public Speaking, 2 hours.....	Th., 2:30-4:30

For statement of work in each subject see pages 42-72

THE ENGINEERING SCHOOL**GENERAL ENGINEERING DEPARTMENT**

- OLIN H. LANDRETH, A. M., C. E., Sc. D.
Professor of Civil Engineering
- GEORGE L. LYON, B. S., C. E.
Assistant Professor of Civil Engineering
- WARREN C. TAYLOR, S. B.
Assistant Professor of Civil Engineering
- JOHN A. C. CALLAN, M. C. E., M. A.
Instructor in Engineering Drawing
- MORTIMER F. SAYRE, E. M., A. M.
Instructor in Engineering

ELECTRICAL ENGINEERING DEPARTMENT

- ERNST J. BERG, M. E., Sc. D.
Professor of Electrical Engineering
- CHARLES P. STEINMETZ, A. M., Ph. D.
Professor of Electro-Physics
- WALTER L. UPSON, M. E., M. S., M. E. E.
Associate Professor of Electrical Engineering
- MORLAND KING, M. E. E.
Assistant Professor of Electrical Engineering
- JOHN N. VEDDER, A. M.
Assistant Professor of Thermodynamics
- EVERETT S. LEE, B. S.
Instructor in Electrical Engineering

Historical. Before the beginning of technical education at Union College unusual attention was given to instruction in science. The first full professorship in natural science in an American college was founded at Union and it is a matter of special scientific interest that Prof. F. R. Hassler was called from this chair in 1811 to establish the United States Coast Survey.

The engineering school of Union College is one of the oldest technical schools of the country. Founded in 1845 with Prof. William M. Gillespie at its head, it at once took high rank, and for many years was one of the few engineering schools in America. From the first it was the evident policy of the school to adapt the thorough training of L'Ecole des Ponts et Chaussées, of

Paris, France, where Prof. Gillespie had finished his technical education, to the demands of professional practice in a vigorous new country, where resources and opportunities were abundant, and where capital and professional precedent were wanting. From the characteristic tendencies impressed on the school at its foundation it has never departed, although it has endeavored to keep pace with the development in American technical education and with the increased demands on professional training. For many years civil engineering only was taught; then, as the principles of modern sanitary science came to be better understood and the possibilities of their further development and their utilization as life-saving agencies were discerned, a course in sanitary engineering was established; and more recently a course in electrical engineering was added.

During its whole history the school of engineering at Union has stood for broad, fundamental training rather than for narrow specialization and during recent years, since its advanced entrance requirements have made room in the course, increased time and attention have been given to culture studies and to a larger proportion of academic training.

Local Advantages. Schenectady is a peculiarly favorable location for an engineering school. The city is on the Mohawk River, and is intersected by several steam railroads, a number of inter-urban trolley lines and the Erie Canal, furnishing many bridges and other engineering works. At Schenectady are also located the works of the General Electric Company and of the American Locomotive Company, each an extensive and leading industry in its respective line. Among other interesting engineering features may be mentioned the city grade-crossings improvement completed at a cost of a million dollars, and the city water-works, which contain in their outfit a system of ground-water wells and a set of electrically-driven multiple-stage centrifugal pumps, of twenty million gallons daily capacity. The neighboring cities of Albany, Troy and Cohoes, as well as the surrounding territory, offers numerous examples of good engineering and many features of value as aids in engineering training. Among these may be mentioned the scientific departments of the

state government at Albany, comprising the state engineer's department, which includes also the new barge canal, the good roads division and the bureau for testing materials; the headquarters of the state water supply commission, which includes also the state river improvement work; the headquarters of the Public Service Commission for district No. 2; the state library, which is well supplied with technical and engineering works; the Albany city water filtration plant; at Troy, the Burden iron works and the Gurley engineering instrument manufactory; at Watervliet, the United States arsenal and gun factory; the water power developments and electric power transmission plants at Mechanicville, Spier Falls, Schaghticoke and Johnsonville; the hydraulic cement works at Glens Falls and at Howe's Cave; and the modern sewage disposal systems at Saratoga Springs, Ballston Spa and Scotia. The new barge canal will pass the Cohoes falls by a flight of locks and will pass Schenectady by a system of locks and dams, both permanent and movable, now under construction, which will canalize the Mohawk River, calling for extensive and interesting engineering operations. All these sources of aid are utilized in the work of the school.

COURSES OF STUDY

Undergraduate Courses. Three undergraduate courses of study in engineering are offered, extending through four years. (1) A four-year course in general engineering, which is intended to give the basis of a broad engineering education, including the fundamental principles underlying the special branches of the profession; (2) A four-year course in sanitary engineering which differs from the general engineering course by substituting special work in sanitary subjects for some of the general engineering studies; and (3) a four-year course in electrical engineering, in which the last two years are devoted to essentially mechanical and electrical engineering subjects.

These three courses are identical during the first two years, the sanitary course differing slightly from the general during the last year, while the electrical course in its last two years differs widely from the other courses. The degree of Bachelor

of Engineering (B.E.) is given for the successful completion of any one of the above three courses.

Graduate Courses. In addition to the above undergraduate courses in engineering, the following graduate courses and degrees are offered:

The degrees of Master of Civil Engineering (M. C. E.) and of Master of Science in Electrical Engineering (M. S. in E. E.) are given on the satisfactory completion of one-year graduate courses of resident study in civil engineering and in electrical engineering, respectively. The degree of Doctor of Philosophy (Ph. D.) is given to candidates who have received the master's degree, on the completion of an additional course of two years of graduate study in electrical science. See page 142.

The non-resident degree of Civil Engineer (C. E.) and Electrical Engineer (E. E.) may be conferred upon graduates of Union College under conditions explained on page 142.

STUDIES OF THE THREE COURSES

The following is an outline of those studies which in general are common to the three four-year courses in general, sanitary, and electrical engineering. The studies which are peculiar to each are outlined under the separate departments.

Following the distinction between the two kinds of training above mentioned, the studies here outlined are arranged under the two heads of general studies and technical studies.

General Studies

Mathematics. All instruction under this head is given by the Department of Mathematics.

See pages 62-63 for detailed statement.

Physics. The instruction in physics comprises a series of lectures on experimental physics, accompanied by classroom and laboratory work. Physics laboratory work is required of all engineering students.

See pages 64-66 for detailed statement.

Chemistry. General chemistry is taught by lectures, recitations

and laboratory work during the freshman and sophomore years and laboratory work in qualitative analysis is continued through the first term of the junior year. Sanitary engineering students, in addition to the above, take chemical laboratory work during the first and second terms of the senior year and work in sanitary analysis during third term.

See pages 66-68 for detailed statement.

Astronomy. The instruction in astronomy includes physical astronomy, spherical trigonometry and the theory of astronomical instruments. These studies are preparatory to the work in astronomical surveying and geodesy given in the general engineering course. In the electrical engineering course the work is confined to descriptive astronomy.

See pages 64-66 for detailed statement.

Biology. Physiology is a required study in each of the three engineering courses. Structural botany is given in the general and sanitary courses, and bacteriology is given in the sanitary course. Structural botany includes the microscopic study of the vegetable cell, the tissues and the tissue-system of the higher plants with special reference to the use of woods in the constructive arts. In bacteriology some of the common bacteria of water, air and soil are studied according to the methods of modern bacteriological work. The accompanying lectures treat of bacteria in regard to their place and role in nature and their relations to sanitary science.

See pages 68-70 for detailed statement.

Geology. (Not required in the electrical engineering course.) This work comprises a course in economic geology, which includes the general principles of geology and a discussion of the occurrence and distribution of minerals and mineral materials for construction in the United States.

See pages 68-70 for detailed statement.

English. The instruction in English aims at a general acquaintance with English literature and a correct, clear and forcible use of the language. Rhetoric is studied throughout the freshman year. In the first term a summary review of diction is given.

In the second and third terms more attention is given to the development of thought by work upon kinds of composition and the paragraph. In the sophomore year English literature as represented by the work of the essayists and by Shakespeare is studied. In the senior year one of the required essays of each term will be upon a technical subject prepared under the direction of the professor of civil engineering, the object being to give the engineering student practice in the preparation of clear, concise and systematic reports on engineering subjects.

See pages 52-56 for detailed statement.

Modern Languages. All engineering students at the time of entrance must have had two years of either French or German. After entering they are required to pursue French and German each for one year. This will be advanced work for the language offered at entrance, and elementary work in the language not offered. Some work in scientific French and scientific German is done during the latter part of the course.

See pages 45-52 for detailed statement.

History and Economics. American history throughout the junior year and economics during the first term of the senior year are required of all engineering students.

See pages 56-61 for detailed statement.

Economics, Political Science and International Law. General engineering students who elect Option B in engineering administration are required to have economics during the three terms of the senior year, political science during the first two terms, and international law during the last term.

See pages 60-61 for detailed statement.

Physiology and Physical Training.

See pages 70-72 for detailed statement.

Voluntary Studies. Any of the studies of the academic courses of the college may be taken by engineering students without extra charge, on approval of the faculty.

Technical Studies

The following technical subjects are included in each of the three engineering courses, and the instruction therein is given in the general engineering department.

G.E.6. Analytical Mechanics. The subjects taught under this head are statics, dynamics, hydro-statics, hydro-dynamics, and pneumatics. These studies form the foundation for applied mechanics, strength of materials and stresses in framed structures, all of which are fundamental to engineering designing.

Required of all engineering sophomores. Three hours weekly during first term and two hours weekly during the second and third terms.

G.E.11. Freehand Drawing. This course includes the study of form, proportion, and perspective; light and shade; the æsthetics of decorative and applied design; drawing from models; and engineering lettering.

Required of all engineering freshmen. One lecture and two drawing periods weekly during the first term.

G.E.12. Mechanical Drawing. This course takes up the study of projections of solids in the four quadrants; the development of working drawings; isometric and oblique projections; care and use of drawing instruments; mechanical lettering; and blue printing. Architectural and engineering subjects are treated in the working drawings.

Required of all engineering freshmen. One lecture and two drawing periods weekly during the second term.

G.E.13. Descriptive Geometry. This course is a continuation of G.E.12. Original problems relating to the stationary and revolved positions of points, lines and planes are given in addition to the study of the first seventeen problems of Church's Descriptive Geometry. The application of the subject to practical problems is emphasized.

Required of all engineering sophomores. One recitation and two drawing periods weekly during the second term.

G.E.14. Descriptive Geometry (continued). This course is a continuation of G.E.13. Study is made of problems relating to tangent planes; intersections and developments of plane and curved surfaces; shades and shadows and linear perspective. Practical application to various architectural and engineering details are considered. Use is made of the Schroeder models, the Olivier models and the models of intersection of the Paris polytechnic school.

Required of all engineering sophomores. One recitation and two drawing periods weekly during the third term.

G.E.21. Mensuration. A thorough study is made of the mensuration of lines, surfaces and solids used in engineering practice. It forms a preparation for the work in surveying.

Required of all engineering freshmen. Two hours weekly during the second term.

G.E.22. Surveying and Plotting. A careful study is made of surveying instruments, treating their adjustment and use; and the determination of their instrumental constants, errors and limits of precision. In field work the classes are divided into small sections and directed by the instructors. Office computations, plotting and mapping are made adjuncts of the field survey.

Required of all engineering freshmen. One recitation and one field or drawing period weekly during the third term.

G.E.23. Plane Surveying. This course is a continuation of G.E.22, and consists of a study of the methods of plane surveying. Field work is conducted along thoroughly practical lines and a complete traverse, with its details, is worked out by each student, together with other important problems.

Required of all engineering sophomores. One recitation and one field or drawing period weekly during the first term.

G.E.61. Engineering Lectures. Lectures are given on topics pertaining to the training and qualifications of an engineer and to the engineering profession. Students are assigned parallel readings bearing on these topics.

Required of all engineering freshmen and sophomores. One

hour weekly during the first and second terms of the freshman year and the third term of sophomore year.

G.E.62. Summer Vacation Work. All students in the Engineering courses during their summer vacation following the freshman, sophomore and junior years are required to prepare a report on their summer work. This report must be done under one of the following options:

- a) Actual participation in engineering work.
- b) Investigation by research and reading.
- c) Critical examination of some engineering project.
- d) Critical reading and abstract of a stated amount from an approved list of books. The details of these options are announced by the department.

The work is due at the opening of the fall term.

G.E.63. Commencement Term Work. In addition to the weekly field and laboratory exercises throughout the year, all freshman and sophomore engineering students, and juniors in the general engineering course, are given an uninterrupted fifteen days' course in field-practice and laboratory work supplementary to the studies in which such practice is desirable. The course begins on the day (Thursday) following Commencement and continues through that and the two following weeks. The work is so selected and arranged as not only to supplement the studies of the year, but also to give instruction and practice in the organization, operation and direction of work conducted by engineering parties. This work receives three hours' credit in the fall term grades.

Thesis. Each candidate for graduation is required to present on or before the third Wednesday in May of his graduation year a satisfactory thesis on a subject that has been approved by the professors of civil engineering or of electrical engineering. This thesis must be original in its character and may be either a design for some engineering structure or plant, process or operation, or an independent investigation of some principle, problem or matter of engineering importance. Reviews or copies of existing structures, plants or processes, un-

less of special educational value or involving original investigation, will not be approved as subjects. This thesis is to be in a form prescribed at the time of approval of the subject, and is to be bound for deposit in the library of the engineering school, and must be presented in this shape on or before the stipulated date. The subjects, with outlines of the proposed treatment, must be submitted in time for final approval not later than November 1st preceding graduation, and the work on the theses must be presented for inspection and criticism of the professor in charge of the department at intervals during progress

GENERAL ENGINEERING DEPARTMENT

Two Optional Courses. In the four-year general engineering courses two optional courses are offered, either of which may be selected by general engineering students at the beginning of the junior year, and each of which extends through the junior and senior years.

The first of these courses, designated as Option A, offers a broad, fundamental, general engineering training such as a thoroughly trained engineer should have before specializing in any of the branches of the profession.

The other course, designated as Option B, while in the main identical with the former, differs from it by omitting some of the more technical subjects, such as stereotomy, kinematics, least squares, sewerage, geodesy and field astronomy, and by substituting therefor, sociology, the elements of law, political science and international law, the principles of finance and financial operations, the principles of business management and accounting, and additional work in history and in engineering law and procedure. The object of this course is to offer to engineering students an opportunity better to qualify themselves for engineering positions of an executive or administrative character. These two options are also offered in the six-year general engineering course and extend through the fifth and sixth years.

The details of these two optional courses will be found on pages 119, 120, 122, 123.

In addition to the studies common to all engineering courses

previously described on pages 87-93 the following subjects are included in the general engineering course:

G.E.9. Spherical Trigonometry and Astronomy. A short course in descriptive and mathematical astronomy with some preliminary work in spherical trigonometry is given by the Department of Physics.

Required of general engineering juniors in Option A. Three hours weekly during the third term.

G.E.16. Stereotomy. This course comprises an extension and application of the principles and methods of descriptive geometry to the study and design of the various forms of solids, and to the preparation of the necessary patterns, templates, forms, etc., required in construction.

Required of general engineering juniors in Option A. Two periods weekly during the second term.

G.E.17. Machine Drawing. This work supplements the classroom work in kinematics. A study is made of the representation of machine motions and their analyses, including gears and their motions.

Required of general engineering juniors. One drawing period weekly during the second term.

G.E.24. Topographical Surveying. The class room work considers various kinds of surveying, including land, city, mining, and hydrographic surveying. Field practice in topographical methods, stadia traversing, and triangulation supplements the recitation work. A map topographical is plotted during the term.

Required of general engineering juniors. Two recitations and one field drawing period weekly during the first term.

G.E.25. Route Surveying. A rigorous study is made of the elements of railroad reconnaissance and location, including the details of railroad curves and turnouts. A considerable portion of the time is spent in field problems and in the practical methods employed in office computations.

Required of general engineering juniors. Two recitations and one field period weekly, during the third term.

G.E.26. Geodesy and Field Astronomy. After a study of the fundamental principles of the adjustment of errors and their use in establishing empirical formulas, a discussion of the figure of the earth, triangulation, base lines, and precise leveling is taken up. This study is accompanied by field work, which includes the determination of time, latitude, and azimuth, with ordinary instruments and with observatory methods and instruments.

Required of general engineering seniors in Option A. Two recitations and one field period weekly during the third term.

G.E.31. Applied Mechanics. This course comprises the extension of analytical mechanics and the development of the methods of graphical analysis with their applications to engineering problems, operations and constructions, particularly the treatment of stresses, strains, deflections and deformations in elastic materials and structures due to extraneous forces.

Required of general engineering juniors. Four hours weekly during the first term.

G.E.32. Mechanics of Materials. This course is an application of portions of G.E.31 to mechanics of materials. In conjunction with this work is given the study of the production, preparation, strength and physical properties of the various engineering materials, including timber, stones, cement and lime mortar, cast iron, wrought iron and structural steel.

Required of general engineering juniors. Three hours weekly during the second term.

G.E.39. Engineering Laboratory. This course includes the testing of structural materials in the mechanical and cement laboratories. Work is carried on supplementary to Mechanics of Materials, G.E.32.

Required of general engineering juniors. Two hours weekly during the second term.

G.E.33. Stresses.

Required of general engineering juniors. Four hours weekly during the third term.

G.E.34. Engineering Stresses.

Required of general engineering seniors. Four hours weekly during the first term.

G.E.35. Engineering Design.

The courses in applied mechanics and materials and engineering stresses prepare the student to undertake the study of engineering design proper, which is pursued throughout the senior year; an important feature of this course is the work in bridges, railroads and water-power development, architectural engineering, etc. The exercises in this line of work are, as far as possible, chosen from professional practice, and the student is expected to carry out, from assigned data and conditions, the preliminary study, determinations of stresses, types, dimensions and details, and to turn in the results in the form of working drawings, diagrams and memoirs. The course is preceded by a series of lectures on the principles and economics of designing. The department possesses a large collection of drawings and photographs of representative engineering structures from which students can form correct ideas of modern practice in the designing of details and in the methods followed on works of this class. The course in senior engineering design is also supplemented by actual design in the drafting room, including a steel mill building and a plate girder bridge.

Required of general engineering seniors. Four hours weekly during the second and third terms.

G.E.36. Building Construction. This is a recitation and lecture course on the principles and practice of building construction, including a thorough discussion of the proportions and properties of concrete as applied to construction work.

Required of general engineering seniors. Two hours weekly during the second term.

G.E.40. Reinforced Concrete. This is a short course treating the principles of reinforced concrete with their application to structural design. G.E.36 is a prerequisite to this course.

Required of general engineering seniors, Options A and B. One hour weekly during the third term.

G.E.37. Railroad Construction. In this course, which is a continuation of the course in junior route surveying (G.E.25), a complete investigation is made of railroad equipment; location and construction; maintenance of way; buildings and yards. A railroad route with its terminal is made in the field and the plans and estimate are computed in the drafting room.

Required of general engineering seniors in Option A. Three recitations and two field or office periods weekly during the first term.

G.E.38. Highways and Pavements. The course in highways comprises a consideration of the highway as an element in the transportation system of the state and of the principles of its economic location and proper construction, with a study of modes of construction, materials, maintenance, and systems of highway laws and administration.

There is also a study of the methods of laying out and grading streets and pavements and of the various street accessories, paving methods and materials and their treatment, with special reference to their economic and sanitary aspects.

Required of general engineering juniors. Four hours weekly during the first term.

G.E.41. Engineering Law and Procedure. This course includes a treatment of the fundamental development of law from the Roman and English Common Law, the function of the state in general, and the American system of federal and state jurisdiction in particular. Some attention is given to the fundamental bases of the law of contracts, agency, property rights and corporations; and to the principles of finance and financial operations.

Required of general engineering seniors in Option A and sanitary divisions. Three hours weekly during second and third terms.

G.E.42. Elements of Law.

Required of general engineering juniors in Option B. Three hours weekly during the second term.

G.E.43. Law of Property and Contract.

Required of general engineering juniors in Option B. Three hours weekly during the third term.

G.E.44. Principles of Law of Corporations. This course includes a treatment of the fundamental development of law, the function of the state in general and the American system of federal and state jurisdiction in particular. Attention is given to the fundamental bases of laws, contracts, agency, property rights, and corporation and municipal laws. The subjects are treated more extensively than in Option A (G.E.41).

Required of general engineering seniors in Option B. Three hours weekly during the first term.

Principles of Finance, Business, Accounting. General engineering students who elect Option B are given instruction in the principles of finance and financial operations, the principles of business and of industrial organization, and the principles of accounting and of cost-keeping. The following three courses, G.E.46, 47, 48, are offered:

G.E.46. Principles of Finance.

Required of general engineering seniors in Option B. Two hours weekly during the second term.

G.E.47. Principles of Administration.

Required of general engineering seniors in Option B. Three hours weekly during the third term.

G.E.48. Principles of Accounting.

Required of general engineering seniors in Option B. Three hours weekly during the third term.

G.E.51. Hydraulics. This course is a study of the fundamentals of hydraulics and hydraulic measurement, with the development of the theory and practice involved.

Required of general engineering juniors. Three hours weekly during the second term.

G.E.52. Water Supply Engineering.

Required of general engineering seniors in Option A. Three hours weekly during the second term.

G.E.53. Water Supply, Sewerage and Sewage Disposal.

The course in hydraulics is followed by a fuller development of the subject as applied to rain-fall, run-off and storage of water, in relation both to water power and to potable water supplies. This course is accompanied by a study of the sanitary aspects of the subject of water supply and its preservation from contamination. An outline study is also made of pumping engines. The new laboratory affords opportunity for experimental work on flow of waters through orifices and pipes, and for tests of pumps, etc.

Required of general engineering seniors in Option A. Five hours weekly during the third term.

G.E.56. Kinematics. This course treats of the fundamentals of machine design and analysis of motion. Class room work is supplemented by machine drawing (G.E.17).

Required of general engineering juniors in Option A. Three hours weekly during the second term.

G.E.57. Thermodynamics. This course consists of lecture, recitation and exercise work in the principles of thermodynamics, including the thermal properties of gases and vapors, saturated and superheated steam, the steam indicator and the steam engine.

Required of general engineering juniors. Two hours weekly during the second term.

G.E.58. Motors and Motive Power. Following the work in thermodynamics and hydraulics of the second term of the junior year an outline course in motors and motive power is given in the third term of the junior year and the first term of the senior year, comprising a study of the sources of demand and supply of power, steam-boilers, steam-engines, steam turbines, water-wheels and turbines, gas-engines, electric motors and transmission of power by shafting, belting, rope-driving, compressed air and electricity. The new laboratory affords opportunity for efficiency tests of hydraulic and other forms of motors.

Required of general engineering students. Three hours weekly during the third term of junior year and two hours weekly during the first term of senior year.

G.E.59. Electrical Machinery. A three-hour course in the fundamental principles and practice of electrical generators, motors, transformers, transmission and instruments as given by the Electrical Engineering Department.

Required of general engineering seniors. Three hours weekly during the second term.

G.E.64. Outlines of Architecture. This course is a study of the historical development of architecture as exemplified in the different orders and styles.

Required of general engineering seniors. Two hours weekly during the third term.

Equipment

General Engineering Building. The new engineering building, the donation of Mr. Andrew Carnegie for the general engineering department, erected at a cost of \$100,000, is a handsome structure of modern design, built of gray and buff pressed brick with gray stone trimmings.

The building is of fireproof construction throughout, the only wood used being in the doors, windows, and floor surface. It covers an area of 67 x 137 ft. and is three stories in height, with a basement above the ground level, making it practically four stories.

The entire east end of the basement, 50 x 62 ft. in area, is used as a hydraulic laboratory. It is equipped with a steel tank 5 ft. in diameter and 52 ft. high, extending to the roof, with a tight cover so that it can be used as either a gravity or a pressure tank. The base of the tank is provided with connections for standard orifices of various sizes and shapes. Connections will also be provided so that turbines and other forms of water motors can be driven by water from the tank under different heads. This room also contains a concrete canal 5 ft. deep, 9 ft. wide and about 20 ft. long, which will be extended out of doors to a total length of 100 ft. It will be arranged for the insertion of temporary dams at different points along its length, so that weirs may be used for the measurement of large flows of water. It is also to be used as a large measur-

ing tank in connection with pump tests, and for various other hydraulic experimental purposes.

In the southwest corner of the basement is the cement laboratory, 46 x 26 ft. in area, equipped for the testing of cement, concrete, and similar structural materials. The northwest corner of the basement is taken up by a room for surveying instruments, with lockers, etc., for issuing equipment to field parties.

In the northeast corner is a large laboratory equipped with applied mechanical apparatus; the southeast corner is an engineering museum, where models of bridges and other engineering structures are placed, so as to be accessible for inspection.

The museum is connected by sliding doors with the engineering library and reading room. Here is placed the valuable Croes library, recently donated by E. B. Van Winkle, of the class of 1860, and also the large collection of engineering drawings, etc., belonging to the department.

The first floor also contains two recitation rooms, and one drawing room for the use of the class in engineering design.

On the second floor the north half is taken up by two large lecture or society rooms, each of which can be divided by folding partitions into two recitation rooms of the usual size. The south half of this floor is taken up by a computing room and building construction museum and one large and one small recitation room. In the southeast corner is the sanitary engineering laboratory.

On the third floor are two large drawing rooms, each about 24 x 60 ft., and three smaller drawing rooms. All of these rooms are well lighted by windows and skylights. On this floor is also a good-sized blue-print room, a photographic room, and a dark room.

Each floor contains two or more small private offices for the use of instructors; and the entire plan of the building is admirably adapted to the needs of the department.

Instruments and Apparatus. The department is supplied with field instruments of the best description, comprising a large theodolite, suitable for refined geodetic operations, transits, surveyors' compasses, prismatic compasses, Burnier's compass, solar

compass, Y levels, plane tables, sextants, and a marine chronometer.

The extensive private collection of models and instruments belonging to the late Professor Gillespie was purchased for the engineering school.

The collection of models in descriptive geometry and stereotomy is very complete. The following are some of the most important:

The Olivier Collection. This consists of about fifty models, representing the most important and complicated ruled surfaces of descriptive geometry, particularly warped or twisted surfaces. Their directrices are represented by brass bars, straight or curved, to which are attached silk threads representing the elements or successive positions of the generatrices of the surfaces. Each of these threads has a weight suspended by it, so as always to make it a straight line. These weights are contained in boxes sustaining the directrices and their standards. The bars are movable in various directions, carrying with them the threads, still stretched straight by the weights in every position they may take; so that the forms and natures of the surface which they constitute are continually changing, while they always remain ruled surfaces. In this way a plane is transformed into a paraboloid, a cylinder into a hyperboloid, etc.

These models were invented by the late Theodore Olivier while professor of descriptive geometry at the Conservatoire des Arts et Métiers, in Paris. One set of them is now deposited there, and a second is in the Conservatory at Madrid. Copies of some of them are to be found in most of the polytechnic schools of Germany. The Union College set is the original collection of the inventor, having been made in part by his own hands, and, after his death, in 1853, retained by his widow till bought of her by Professor Gillespie in 1855. It is more complete than that in the Paris Conservatoire. It may be worth noticing that the silver plates on the boxes, reading "*Inventé par Théodore Olivier*," etc., were added by Madame Olivier, at her own expense, after the purchase, as a tribute to the memory of her husband, her own

words being, "*Je tenais à ce que chaque instrument portât le nom du savant dont la réputation passera à la postérité.*"

Bardin's Models (Paris), in plaster, (seventy), of the intersections of prisms, pyramids, cones, etc.

Schroeder's Models (Darmstadt) of elementary descriptive geometry (twenty). The planes of projection are in wood, and the lines and surfaces in metal; models illustrating shades and shadows.

Stone Cutting Models (twenty), in plaster, selected from those of L'Ecole Polytechnique of Paris.

Professor Bardin's models (ten) in plaster, of oblique arches. Groined and cloistered arch models (ten) in wood and plaster.

Models of structures in stone, consisting of bridges, culverts, etc.

Winding-stair models in wood and plaster. Full sized models of voussoirs and skew-backs of an oblique arch.

Models in Topography. French and German plaster models, giving all the different forms of ground, accompanied by topographical drawings, showing how to represent these forms by contour lines; hatchings and shades from vertical and oblique light; models and maps in colored topography; a large model of Mount Cenis pass, showing the wagon road and contour lines.

Architectural Models. Models of the five orders of architecture from L'Ecole des Beaux Arts, Paris; portals; stairs; roofs; walls; buttresses; domes, etc.

Engineering Models. Schroeder's models of joints, brick bonds, etc.; spur wheels; bevel wheels; cranes; pile drivers; various forms of water-wheels; pumps; cylinders; valves; eccentrics; etc.; steam engines.

Casts of St. Venant's models showing the changes of form in bodies subjected to flexure. Full sized model of the liquid vein measured by Poncelet and Lesbros.

Models of bridges of various systems, comprising truss, suspension, tubular and arch bridges; Doyne's dynamometer bridge models showing, by means of dynamometer, strains at different

points; models of roof trusses, arranged for using the dynamometer to show the different stresses.

Models of fortifications, illustrating Vauban's system; shot, shell, etc.

Models of culverts, piers, abutments, culvert heads, wing walls, rail sections, etc.

Maps, Drawings, Etc. This collection embraces a large number of maps, plates, profiles, topographical drawings and spherical projections; about fifty thousand engravings, lithographs, photographs and detail drawings of engineering and architectural structures; working drawings of machines, bridges, buildings, etc.

Physical Apparatus. To illustrate the lectures in physics, the college has an extensive collection of apparatus. This has been secured largely from foreign makers and includes special pieces of apparatus constructed under the direction of the late Professor Foster, besides sets of apparatus of standard patterns by Koenig, Duboscq, Ruhmkorff, and others.

In Mineralogy. The Wheatley collection contains nearly 4,000 specimens of minerals, the result of the labors of Charles M. Wheatley. All of these have been labeled according to the nomenclature and order adopted by Dana. They are without exception, open at all times to the students. They furnish an admirable means of practical illustration in mineralogy. Among the rare and valuable specimens are those of anglesite, cerusite, mimetite and calcuprite, which in American specimens are equaled only by those in the British Museum. There are many fine specimens representing the noble metals from all parts of the world. There are few known species of minerals of which the collection does not contain some specimens.

In addition to this there is a large series of unlabeled specimens for crystallographic and blow-pipe examination.

In Metallurgy. The college possesses a suite of ores of the useful metals, comprising over 1,000 specimens. These have been arranged to illustrate their mode of occurrence and geographical distribution. In addition are the fluxes, fuels, etc., used in obtaining the metals from the ores, together with the slags and

metals themselves in various forms. There is a large number of models and drawings of stacks, furnaces, etc.: also suites of specimens of wood, charcoal, mineral coal, peat, etc., for physical inspection; also specimens of most of the useful alloys.

In Chemistry. The chemical laboratory is furnished with tile-top desks and lockers, and all the modern apparatus necessary for work in general chemistry and qualitative and quantitative analysis. Ample hoods occupy one side of the laboratory, where the student may work with the disagreeable and poisonous gases. In the private laboratory of the professor of chemistry provision is made for any students who may desire to pursue advanced courses, either in volumetric analysis, water and milk analysis, organic chemistry, or any special work in connection with courses of other departments.

A large number of specimens of the materials used in the manufacture of the mineral and some of the organic acids; the crude products themselves and the materials used in the manufacture of the alkalis, soaps, matches, black lead, candles, petroleum products; linseed, olive, castor, cottonseed and other oils; paper, porcelain, glass, fire and building brick, mortar and cements, beet and cane sugar, white lead and other paints, etc., etc., form a part of the permanent collection of the department.

SANITARY ENGINEERING DEPARTMENT

General Considerations. The extensive development of sanitary biology during recent years and the establishment on a firm, scientific basis of the germ-theory of disease have laid a secure foundation for the important specialty of sanitary engineering. Already the practical application of the principles in many lines of public utility, as well as in medicine and surgery, has resulted in a very marked decrease in the annual death rate. The most fruitful line of application of this recent and useful knowledge lies in the intelligent design, construction and operation of municipal public works and of systems of water supply, sewerage, and drainage, heating and ventilation of private residences, schools, hotels, hospitals and other public institutions and buildings.

General Scheme of the Course. The course in sanitary engi-

neering is the same as Option A of the general engineering course for the first three years. During the fourth year the course differs from the general engineering course by omitting astronomical surveying, geodesy and railroad construction, and substituting therefor sanitary biology, heating and ventilation, house drainage and plumbing, sanitary codes and laws, and an increase in the amount of chemistry and chemical laboratory work.

Sewerage and Drainage. The study of the principles and practice of sewerage and sewage disposals is given during the last term of the senior year. The fundamental sanitary and constructive principles are developed and a comparative study of the various systems as well as of the details of construction and maintenance receives careful attention. (See G.E.53.)

G.E.54. Sanitation. This course treats of the sanitary conditions of buildings including drainage and plumbing and also discusses sanitary codes and laws.

Required of sanitary engineering seniors. Two hours weekly during the third term.

G.E.55. Sanitary Analysis. This is a laboratory course given by the Department of Chemistry in the analyses of air, gases, water and sewage.

Required of sanitary engineering seniors. Four periods weekly during the third term.

G.E.60. Heating and Ventilation. This course treats the principles of heating and ventilation with a discussion of the various systems in use. Actual designing problems are made an important part of the work.

Required of sanitary engineering seniors. Three hours weekly during the first year.

ELECTRICAL ENGINEERING DEPARTMENT

Purpose and Methods. A course of instruction in electrical engineering was introduced in 1895, and in 1902 was re-organized and made into a separate department of the engineering school under the direction of Professor Charles P. Steinmetz, consulting engineer of the General Electric Company. In 1913 Dr. Steinmetz resigned as head of the department to become Professor of

Electro-Physics, and Dr. Ernst J. Berg was appointed Professor of Electrical Engineering in charge of the department.

The course of studies offered by the department of electrical engineering aims at a thorough and broad scientific education of the prospective engineer, rather than the specific training of a specialist. The instruction, therefore, consists of three classes of studies. The general culture studies furnish such training as is now considered essential for every educated man, as languages, literature, history, etc. Such instruction extends over a large part of the first two years, and is then followed by a broad and general technical education, giving the student the fundamental principles and their application to all branches of engineering. Ultimately follows the specific instruction in electrical engineering, which, while it enables the student, after graduation, to enter the field of electrical engineering practice in the manufacturing or operating company or consulting engineer's office in a subordinate capacity only, has given him all the necessary requirements to gather in a few years' practice the knowledge needed for independent work of greater magnitude.

The instruction especially aims at a thorough understanding of the fundamental principles rather than a memorizing of numerous facts — that is, aims at quality, and not quantity — and as far as possible in all engineering instruction the subject is brought before the student in three different ways; by a theoretical lecture course with recitations, practical instruction in the electrical laboratory paralleling the lecture course, and, following this, the application of the knowledge gained in lecture courses and laboratory to calculation and design. Finally, more independent work on the solution of engineering problems is undertaken by the students. These problems invariably require some research work; the systematic tabulation of the results with original conclusions constitutes the graduating theses. Throughout the technical course, by work in the laboratory, some familiarity with the apparatus is given to the students before the technical side is taken up in the lecture course, so that when approaching the theoretical studies of electrical phenomena or apparatus the student is already able to appreciate the practical value and importance of the subject with which the theoretical investigations deal.

Through the active interest which the General Electric Company takes in technical education, an arrangement has been effected between the college authorities and the officials of the company by which the students in the junior and senior classes are admitted to the company's works at appointed times, under the direction of their instructor, with the privilege and opportunity of studying and inspecting the plant and operations and of being regularly instructed therein. The work has been systematically arranged, and is given simultaneously with the corresponding class and laboratory work, to which it forms an important and valuable adjunct.

List of Studies

In the following list of studies, only those subjects of the electrical engineering course which are not required in the other courses are described in detail. All the culture studies and most of the general engineering and scientific studies are pursued in common with the students of other engineering branches. Beginning with the junior year, however, the courses diverge. The electrical engineers take up a number of mechanical engineering subjects and continue them throughout the junior and first part of the senior year.

Studies also required in other courses are:

American History	Page 57
Rhetoric	Page 55
Economics	Page 60

In addition to the required studies one of the following subjects is taken as an elective in the senior year:

Comparative Politics	Page 57
Advanced Calculus	Page 63
Economics	Page 60
French	Page 49
German	Page 46
Logic, Psychology and Ethics.....	Page 58
Mathematical Physics	Page 65
Qualitative Analysis	Page 67

The mechanical engineering subjects not previously described are:

M.E.1. Advanced Mechanics. A brief introduction to vector analysis is followed by the study of kinematics in two and three dimensions applying vector methods. The fundamental principles of dynamics are discussed before statics and the elementary theory of structures, the latter subject being given after a short treatment of graphical arithmetic.

Required of electrical engineering juniors. Six hours weekly during the first term.

M.E.2. Advanced Mechanics. Dynamics of a particle and rigid dynamics are treated, introducing force in its kinetic aspect before taking up mechanics of materials where it appears as stress. Under mechanics of materials the elementary theory of strain and stress is developed and applied to beams, columns, plates, springs, etc., variously loaded.

Required of electrical engineering juniors. Four hours weekly during the second term.

M.E.3. Advanced Mechanics. The mechanics of liquids is treated from the standpoint of the energy equation. The course includes the flow of liquids over weirs, flow through orifices and pipes, and the theory of the Venturi meter. Also flow of streams, hydrostatics, and the elements of hydraulic machinery.

Required of electrical engineering juniors. Four hours weekly during the third term.

M.E.4. Thermodynamics. In this course the fundamental principle of thermodynamics is developed along with the mathematics necessary. The mechanical properties of perfect gases are treated together with gas engine cycles, air-refrigeration, etc.

Required of electrical engineering seniors. Three hours weekly during the first term.

M.E.5. Thermodynamics. The fundamental principles are applied to the discussion of the properties of steam and other vapors, as ammonia and carbon dioxide. Their action as the

working media of reciprocating engines, turbines, and refrigerating machines is extensively treated.

Required of electrical engineering seniors. Three hours weekly during the second term.

M.E.6. Thermodynamics. In this course the properties of superheated steam are investigated and a more specialized treatment of steam turbines and gas engines is made.

Required of electrical engineering seniors. Three hours weekly during the third term.

E.E.1. Elements of Electricity and Magnetism. This is a course in the fundamental principles of electricity and magnetism. The prerequisite courses are physics 1a and mathematics 5.

Required of electrical engineering juniors. Three hours weekly during the first term.

E.E.2. Theory of Direct Current Machines. The prerequisite course is E.E.1.

Required of electrical engineering juniors. Three hours weekly during the second term.

E.E.3. Principles of Alternating Currents. This course includes the representation of alternating current waves and a review of the theory of complex numbers. The prerequisite course is E.E.2.

Required of electrical engineering juniors. Three hours weekly during the third term.

E.E.4. Theory of Alternating Current Machines. This course deals with the transformer and the alternator. The prerequisite course is E.E.3.

Required of electrical engineering seniors. Three hours weekly during the first term.

E.E.5. Theory of Alternating Current Machines, Continued. This course deals with the synchronous motor, rotary converter, and alternating current commutator motors. The prerequisite course is E.E.4.

Required of electrical engineering seniors. Three hours weekly.

E.E.6. Advanced Electrical Engineering Theory. This is a course in simple transient phenomena, principles of illumination, and the underlying principles of electric railroading and power plant economics. The prerequisite course is E.E.5.

Required of electrical engineering seniors. Three hours weekly during the third term.

E.E.14. Seminar. This is a course intended to bring the student into touch with phases of electrical engineering which do not enter directly into the work of the other courses. It includes lectures by members of the department, the presentation and discussion of papers by the students themselves, and local trips of inspection to the works of the General Electric Company.

Required of electrical engineering seniors. One two-hour period weekly during the first term.

E.E.15. Seminar. This is a continuation of E.E.14 during the second term.

E.E.16. Seminar. This is a continuation of E.E.14 and E.E.15 during the third term.

E.E.21. Junior Electrical Laboratory. This is a course in laboratory work in which studies and measurements of elementary circuits are carried on.

Required of electrical engineering juniors. One afternoon per week during the first term.

E.E.22. Junior Electrical Laboratory. This is a course in laboratory work dealing with more advanced direct current measurements and the study of elementary alternating current circuits.

Required of electrical engineering juniors. Two afternoons weekly during the second term.

E.E.23. Junior Electrical Laboratory. This is a course in laboratory work dealing with more advanced direct current measurements and the study of elementary alternating current circuits.

Required of electrical engineering juniors. Two afternoons weekly.

E.E.24. Senior Electrical Laboratory. This is a course in labor-

atory work dealing with alternating current circuits and apparatus, especially the transformer and alternator.

Required of electrical engineering seniors. Two afternoons weekly during the first term.

E.E.25. Senior Electrical Laboratory. This is a course in laboratory work dealing with the synchronous and induction motors and the synchronous converter.

Required of electrical engineering seniors. Two afternoons weekly during the second term.

E.E.26. Senior Electrical Laboratory. This is a course in laboratory work taking up advanced studies with special apparatus and completing the work of the preceding course.

Required of electrical engineering seniors. Two afternoons weekly during the third term.

E.E.35. Electrical Machine Design. This is a course in the designing of electrical apparatus including the special study of the transformer.

Required of electrical engineering seniors. Three hours weekly during the second term.

E.E.36. Electrical Machine Design. This is a course in the design of electrical apparatus including the special study of the alternator and commutating machines.

Required of electrical engineering seniors. Three hours weekly during the third term.

Thesis. On vote of the faculty, students of high standing are permitted to prepare a thesis on some original problem.

Special Lectures. During the year a few lectures on highly specialized subjects are given by engineers who are also attending the graduate courses in Electrical Engineering. These lectures are open to juniors, seniors and graduates, and are optional.

To juniors, seniors and graduate students of the course is available the notable privilege of becoming, upon payment of a nominal fee, members of the Schenectady Section of the American Institute of Electrical Engineers. Throughout the winter

occur, before this society, a succession of lectures probably without an equal except before the national body itself.

Electrical Laboratory Equipment

The electrical engineering laboratory is a commodious, well-lighted building, and permits the arrangement and grouping of the machines in a flexible relation to each other.

The ground plan of the building is T-shaped. The upper bar of the T is two stories. The lower floor is devoted to the main laboratory, which is 101 ft. by 35 ft. outside dimensions.

Two large recitation rooms and offices occupy the major portion of the second floor.

The purpose of a college laboratory of electrical engineering is two-fold: To familiarize the student with the shape, appearance, relative proportions and construction of modern electrical apparatus, and to instruct him in the handling, assembling, testing and operation of electrical apparatus under normal and abnormal conditions.

Because of the great variety and large size of modern electrical apparatus, the former purpose can be fulfilled very incompletely only, even in the largest and best equipped college laboratories. Through the favorable disposition of the General Electric Company, by giving the electrical engineering students of Union College free access to the works and testing rooms, this purpose is admirably fulfilled here, and by frequent and regular inspection trips to the works and testing department of the Company under the direction of the college instructors, which trips constitute an integral part of the laboratory instruction, the students gain a very intimate knowledge of modern electrical apparatus of all types and sizes, not only when assembled and in operation and test, but also during their construction in the shops.

In equipping the college laboratory special consideration was therefore given to the selection only of such representative types of apparatus as can be handled, operated and tested by the students, and machines are of a size sufficiently large to correspond to modern practice, but not so large as to make the operation under abnormal conditions — that is, under con-

ditions which as a rule are specially instructive — unsafe for the apparatus. All such machinery as the student can not be permitted to handle freely was excluded from the equipment.

Power is supplied from the following sources: A motor-generator set consisting of a 55-h.p. 3-phase 240 volt synchronous motor direct connected to a 30-kw., 125 volt direct current generator; a motor-generator set consisting of a 17.5-kw. direct current generator direct connected to a 3-phase 220-volt induction motor; connection with the 550-volt direct current trolley circuit of the Schenectady Railway Company; connection with a three-phase 2300-volt power circuit of the Schenectady Illuminating Company. In the latter case voltage is reduced by banks of step-down transformers, so that the students can handle the safe low-tension circuits only.

A secondary supply for standardization of instruments is also secured by means of a group of lead plate storage batteries charged by a mercury rectifier upon the alternating current power circuit.

The laboratory equipment contains a large number of direct and alternating current generators and motors of various design and capacity suitable for testing and all of the general and much special experimentation, also a large number of transformers, coils, and condensers, and the measuring instruments suitable for the work.

In addition there are standardizing instruments for the accurate calibration of meters, and for determining resistance, inductance and capacity.

Numerous arc-lamps of different types are arranged for operation either by a constant current transformer or from the 500-volt direct current supply or from a special 2,500-volt direct current generator.

Students are introduced to the direct study of wave forms and some transient phenomena by the use of an oscillograph, and to the phenomena of very high frequency through a fairly complete wireless telegraph installation.

For special study along the line of telephony, there is a complete set of apparatus presented by the Western Electric

Company, including every part that comes into operation between two persons who may be located in different cities.

A second laboratory is located in the basement of Washburn Hall, and consists of two very large rooms which are used mainly for advanced research and special experimentation. In this laboratory every graduate student has his desk and can set up his work without danger of interference from other workers. The equipment is of a special nature and varies according to the work being done.

In particular should be mentioned an artificial transmission line, constructed of large glass tubes wound with wire, and containing distributed capacity, so proportioned as to accurately represent an actual line of about one hundred and twenty-eight miles in length. The object of the line is to permit the study of the effects of switching and other transient effects which have been only partially understood in the design and operation of high voltage, high power systems.

Inspection Trips

It is desirable that each student in the electrical engineering courses participate during his college life in extended trips of inspection of engineering activities. Such trips are, therefore, arranged at a low cost to each man and vary from year to year. Last year the excursion was to Pittsfield and covered only one day. It is the policy of the department to continue to arrange such trips and to conduct them when sufficiently representative groups of men can attend.

GRADUATE COURSES

The general engineering department offers the following graduate course in residence:

The Degree of M. C. E. This course of one year's resident graduate study, consisting of lectures, laboratory and research work, is open to graduates of the general or the sanitary engineering course of Union College or of any other institution of a standing recognized by the faculty. On its successful completion the degree of Master of Civil Engineering is conferred.

The electrical engineering department offers the following graduate courses in residence.

The Degree of M. S. in E. E. To students desiring to continue their studies a short time beyond the four-year course, a graduate course of one year is offered in which, besides instruction in higher branches of electrical engineering, there will be occasion to carry out original investigations in electrical engineering practice on subjects closely connected with the most recent advance of electrical engineering. This course leads to the degree of Master of Science in Electrical Engineering, and is open to graduates of Union College or of other institutions approved by the faculty. The work is to be done in residence, but the lectures are given at such hours as frequently permit students and young engineers of the General Electric Company to attend.

The following courses in Electrical Engineering are given:

E.E.101. A course dealing with transient phenomena and with problems in electro-dynamics.

E.E.102. A course which supplements E.E.101 and covers experimental work of an advanced character.

E.E.103. Lectures given at irregular intervals by Dr. Steinmetz on some phases of electro-physics.

The Degree of Ph. D. The degree of Doctor of Philosophy is not given on the completion of a certain amount of work or the study of stated subjects for a definite period of time, but is intended to be a mark of breadth of training and high attainment. It will be conferred upon the candidate who satisfactorily fulfills the following conditions:

1. The applicant for admission to this course must present a Master's degree received in recognition of work of a nature indicating preparation for advanced electrical study.
2. The candidate must spend at least two years in resident work under direction of the faculty.
3. The major subject of study must be electrical science.
4. Two minor subjects of study must be pursued, one of which is to be philosophy.

5. At the completion of the course, and two months before the conferring of the degree, a suitable thesis must be presented to the head of the electrical engineering department, representing original work and indicating strength and ability in independent investigation.

6. Fifty printed and bound copies of the thesis must be deposited in the college library before the successful candidate may receive the diploma for his degree. The degree may be conferred, however, before such copies are deposited, upon the presentation to the treasurer of proper security for their provision. In this case, a bound typewritten copy shall be placed in the library previous to the conferring of the degree.

Admission. The conditions governing admission to the graduate courses are given under the separate statements above. Correspondence regarding details should be addressed to the head of the department in which work is desired. (See page 84.)

CURRICULA OF ENGINEERING COURSES

The numeral after a subject refers to the course as described in the departmental statement; the number in parenthesis refers to the page where the statement is given.

Courses Leading to Degree of B.E.

Freshman Year, all courses

First Term

French 1 or 1a.....	(49)	3 hours
German 1a or 1.....	(46)	3 hours
English 1.....	(52)	2 hours
Freehand Drawing GE11.....	(90)	3 hours
Mathematics 2.....	(62)	5 hours
Hygiene.....	(70)	2 hours
Lectures GE61.....	(90)	

Total 18 hours

Second Term

French 1 or 1a.....	(49)	3 hours
German 1a or 1.....	(46)	3 hours
English 1.....	(52)	2 hours
Mathematics 2.....	(62)	5 hours
Mensuration GE21.....	(91)	2 hours
Mechanical Drawing GE12.....	(90)	3 hours
Lectures GE61.....	(90)	

Total 18 hours

Third Term

French 1 or 1a.....	(49)	3 hours
German 1a or 1.....	(46)	3 hours
English 1.....	(52)	2 hours
Mathematics 2.....	(62)	5 hours
Surveying and Plotting GE22.....	(91)	2 hours
Hygiene.....	(70)	2 hours
Commencement Term Work GE63.....	(92)	

Total 17 hours

In the second term one credit hour is required in gymnastics.

Sophomore Year, all courses

First Term

Rhetoric 10.....	(55)	1 hour
Mathematics 4.....	(62)	3 hours
Mechanics GE6.....	(90)	3 hours
Physics 2.....	(64)	4 hours

Chemistry 1.....	(61)	3 hours
English Literature 3.....	(53)	2 hours
Topographical Surveying GE23.....	(91)	2 hours
Summer Vacation Work GE62	(92)	

Total 18 hours

Second Term

Rhetoric 10.....	(55)	1 hour
Mathematics 4.....	(62)	3 hours
Mechanics GE6.....	(90)	2 hours
Physics 2.....	(64)	4 hours
Chemistry 1.....	(61)	4 hours
English Literature 3.....	(53)	2 hours
Descriptive Geometry GE13.....	(90)	3 hours

Total 19 hours

Third Term

Rhetoric 10.....	(55)	1 hour
Mathematics 4.....	(62)	3 hours
Mechanics GE6	(90)	2 hours
Physics 2.....	(64)	3 hours
Chemistry 1.....	(61)	4 hours
English Literature 3.....	(53)	2 hours
Descriptive Geometry GE14	(91)	3 hours
Lectures GE61.....	(91)	
Commencement Term Work GE63	(92)	

Total 18 hours

Junior Year, General Engineering, Option A

First Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Applied Mechanics GE31.....	(95)	4 hours
Chemical Laboratory 2.....	(62)	4 hours
Highways and Pavements GE38	(97)	4 hours
Topographical Surveying and Mapping GE24.....	(94)	3 hours
Summer Vacation Work GE62	(92)	

Total 18 hours

Second Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Mechanics of Materials and Eng. Laboratory GE32....	(95)	5 hours
Kinematics and Machine Drawing GE56.17.....	(99,92)	3 hours
Hydraulics GE51.....	(98)	3 hours
Thermodynamics GE57.....	(99)	2 hours
Stereotomy GE16	(94)	2 hours

Total 18 hours

Third Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Stresses GE33.....	(95)	4 hours
Motors GE58.....	(99)	3 hours
Route Surveying GE25	(94)	3 hours
Spherical Trigonometry and Astronomy GE9	(94)	3 hours
Sanitary Biology 3.....	(92)	2 hours
Inspection Trips		
Commencement Term Work GE63	(92)	
		Total 18 hours

Junior Year, General Engineering, Option B*First Term*

Rhetoric 11.....	(55)	1 hours
History 2.....	(57)	4 hours
Applied Mechanics GE31	(95)	4 hours
Highways and Pavements GE38	(97)	4 hours
Chemical Laboratory 2.....	(67)	3 hours
Topographical Surveying and Mapping GE24	(94)	3 hours
Summer Vacation Work GE62	(92)	
		Total 19 hours

Second Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	4 hours
Elements of Law GE42.....	(97)	3 hours
Mechanics of Materials and Eng. Laboratory GE32	(95)	5 hours
Hydraulics GE51.....	(98)	3 hours
Thermodynamics GE57	(99)	2 hours
		Total 18 hours

Third Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	4 hours
Law of Property and Contract GE43	(98)	3 hours
Stresses GE33.....	(95)	4 hours
Route Surveying GE25	(94)	3 hours
Motors GE58.....	(99)	3 hours
Inspection Trips		
Commencement Term Work GE63	(92)	
		Total 18 hours

Junior Year, Sanitary Engineering

First Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Applied Mechanics GE31.....	(95)	4 hours
Chemical Laboratory 2.....	(67)	4 hours
Highways and Pavements GE38.....	(97)	4 hours
Topographical Surveying and Mapping GE24.....	(94)	3 hours
Summer Vacation Work GE62.....	(92)	

Total 18 hours

Second Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Mechanics of Materials and Eng. Laboratory GE32.....	(95)	5 hours
Kinematics and Machine Drawing GE56.17.....	(99.92)	3 hours
Hydraulics GE51.....	(98)	3 hours
Thermodynamics GE57.....	(99)	2 hours
Stereotomy GE16.....	(94)	2 hours

Total 18 hours

Third Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Stresses GE33.....	(95)	4 hours
Motors GE58.....	(99)	3 hours
Route Surveying GE25.....	(94)	3 hours
Spherical Trigonometry and Astronomy GE9.....	(94)	3 hours
Sanitary Biology 3.....	(69)	2 hours
Inspection Trips		
Commencement Term Work GE63.....	(92)	

Total 18 hours

Junior Year, Electrical Engineering

First Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Advanced Mechanics ME1.....	(109)	6 hours
Electrical Engineering Theory EE1.....	(110)	3 hours
Electrical Laboratory EE21.....	(111)	2 hours
Mathematics 5.....	(63)	3 hours
Summer Vacation Essay		

Total 17 hours

Second Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Advanced Mechanics ME1.....	(109)	4 hours
Electrical Engineering Theory EE2.....	(110)	3 hours
Electrical Laboratory EE22.....	(111)	4 hours
Mathematics 5.....	(63)	3 hours
		<hr/>
Total		17 hours

Third Term

Rhetoric 11.....	(55)	1 hour
History 2.....	(57)	2 hours
Advanced Mechanics ME1.....	(109)	4 hours
Electrical Engineering Theory EE3	(110)	3 hours
Electrical Laboratory EE23.....	(112)	4 hours
Mathematics 5.....	(63)	3 hours
		<hr/>
Total		17 hours

Senior Year, General Engineering, Option A*First Term*

Economics 3.....	(60)	3 hours
Railroad and Trolley Road Construction GE37	(97)	5 hours
Engineering Stresses GE34	(96)	4 hours
Economic Geology 7.....	(70)	2 hours
Motors and Motive Power GE58	(99)	2 hours
Mathematics 7.....	(63)	2 hours
One Literary Essay		
One Technical Essay		
Inspection Trips		
Summer Vacation Work GE62	(92)	<hr/>
Total		18 hours

Second Term

Electrical Machinery GE59	(100)	3 hours
Mathematics 8.....	(63)	2 hours
Engineering Design and Construction GE35	(96)	4 hours
Water Supply Engineering GE52	(99)	3 hours
Engineering Law GE41	(97)	3 hours
Mathematics 7.....	(63)	2 hours
Building Construction GE36	(96)	2 hours
One Literary Essay		
One Technical Essay-		
		<hr/>
Total		19 hours

Third Term

Engineering Law and Procedure GE41	(97)	3 hours
Geodesy and Field Astronomy GE26	(95)	3 hours
Outlines of Architecture GE64	(100)	2 hours
Engineering Design and Construction GE35	(96)	4 hours
Water Supply, Sewerage, and Sewage Disposal GE53 ..	(99)	5 hours
Reinforced Concrete GE40	(96)	1 hour
Thesis		
		<hr/>
Total		18 hours

Senior Year, General Engineering, Option B*First Term*

Economics 1	(60)	3 hours
Comparative Politics 4	(57)	3 hours
Principles and Laws of Corporations GE44	(98)	3 hours
Motors and Motive Power GE58	(99)	2 hours
Engineering Stresses GE34	(96)	4 hours
Mathematics 7	(63)	2 hours
Economic Geology 7	(70)	2 hours
One Literary Essay		
One Technical Essay		
Inspection Trips		
Summer Vacation Work GE62	(92)	<hr/>
Total		19 hours

Second Term

Economics 2	(60)	3 hours
Comparative Politics 4	(57)	3 hours
Principles of Finance and Financial Operations GE46 ..	(98)	2 hours
Electrical Machinery GE59	(100)	3 hours
Mathematics 7	(63)	2 hours
Engineering Design and Construction GE35	(96)	4 hours
Building Construction GE36	(96)	2 hours
One Literary Essay		
One Technical Essay		
		<hr/>
Total		19 hours

Third Term

Economics 2	(60)	3 hours
International Law, H.4	(57)	3 hours
Principles of Administration GE47	(98)	3 hours
Engineering Design and Construction GE35	(96)	4 hours
Outlines of Architecture GE64	(100)	2 hours
Principles of Accounting GE48	(98)	3 hours
Reinforced Concrete GE40	(96)	1 hour
Thesis		
		<hr/>
Total		19 hours

Senior Year, Sanitary Engineering

First Term

Motors and Motive Power GE58	(99)	2 hours
Engineering Stresses GE34	(96)	4 hours
Heating and Ventilation GE60	(106)	3 hours
Chemical Laboratory 5	(68)	3 hours
Economic Geology 7	(70)	2 hours
Economics 1	(60)	3 hours
Mathematics 7	(63)	2 hours
One Literary Essay		
One Technical Essay		
Inspection Trips		
Summer Vacation Work GE62	(92)	_____
		Total 19 hours

Second Term

Engineering Law GE41	(97)	3 hours
Engineering Design and Construction GE35	(96)	4 hours
Water Supply Engineering GE52	(99)	3 hours
Chemical Laboratory 5	(68)	4 hours
Electrical Machinery GE59	(100)	3 hours
Mathematics 7	(63)	2 hours
One Literary Essay		
One Technical Essay		
Inspection Trips		
		Total 19 hours

Third Term

Engineering Law and Procedure GE41	(97)	3 hours
Engineering Design and Construction GE35	(96)	4 hours
Sewerage and Sewage Disposal GE53	(99)	5 hours
Sanitary Analysis GE55	(106)	4 hours
Sanitation GE54	(106)	2 hours
Thesis		
		Total 18 hours

Senior Year, Electrical Engineering

First Term

Economics 3	(60)	3 hours
Electrical Engineering Theory EE4	(110)	3 hours
Seminar EE14	(111)	1 hour
Electrical Laboratory EE24	(112)	4 hours
Thermodynamics ME5	(110)	3 hours
Electives	(81)	3 hours
Summer Vacation Essay		
		Total 17 hours

Second Term

Electrical Engineering Theory EE5	(111)	3 hours
Seminar EE15	(111)	1 hour
Electrical Laboratory EE25	(112)	4 hours
Electrical Apparatus Design EE35	(112)	3 hours
Thermodynamics ME5	(110)	3 hours
Electives	(81)	3 hours

 Total 17 hours
Third Term

Electrical Engineering Theory EE6	(111)	3 hours
Seminar EE16	(112)	2 hours
Electrical Laboratory EE26	(112)	2 hours
Electrical Apparatus Design EE36	(112)	3 hours
Thesis	(113)	1 hour
Thermodynamics ME5	(110)	3 hours
Electives	(81)	3 hours

 Total 17 hours

ATTENDANCE AND STANDING

Registration. Every student must report at the registrar's office at the beginning of each term and register college or local residence.

Any change of residence during the term must be reported at once at the treasurer's office.

Changes of Course. Students are not permitted to pass from one course to another, or to take any studies out of their regular order, without the specific authorization of the faculty.

Chapel. Morning worship is held in the chapel every college day and attendance is required of all students.

Reports. A daily record of scholarship and of attendance at class and chapel is kept and a report is sent at the close of each term, or more frequently, to the student's parent or guardian.

Standing. There are four grades of scholarship:— from 9 to 10 inclusive, first grade; from 8 to 8.9, second grade; from 7 to 7.9, third grade; from 6 to 6.9, fourth grade.

A student who receives a mark of 4 to 5.9 is reported as conditioned; below 4, as having failed. In the mathematical studies of the engineering course the sustaining mark is 7, and any mark below 5 indicates failure.

A student who is reported as having failed in any subject must take that subject again in class; or he may be required, at the option of the department concerned, to make up the subject under an approved tutor, in such manner as the department may designate, and to pass an examination in it at the second conditions examination after the imposition of the mark of failure.

Those receiving the highest marks for the whole course are entitled to appointment as commencement orators, five places being assigned to students in the academic courses and five to students in the engineering courses.

Absences in General. Absences are entered against a student from the beginning of a term until he reports his return to the registrar.

It is expected that for consecutive absences permission will be obtained in advance.

Permissions and excuses are given only by the committee on absences which meets every Monday afternoon from 2 to 5.

Applications for excuses must be made on the first Monday following the date of the absence.

Class-room Absences. Attendance at all exercises is required and it is expected that no student will be absent except in case of unavoidable necessity.

Applications for excuses must be made to the committee on absences the first Monday following the date of absence.

No excuse remits any work of the term. The work lost by reason of excused absence must be made up in a manner satisfactory to the head of the department concerned, unless the nature of the work renders this impossible, in which case the student's grade will suffer.

After a number of unexcused absences equal to three weeks of recitations in any subject, the student is not allowed to continue his work in that subject, but must take it with the succeeding class.

Chapel Absences. Twelve absences without excuse are allowed each term. All absences after the first twelve lower the standing at the rate of one unit for every two absences.

No absences are excused except for protracted illness or for reasons in every way exceptional.

Applications for excuse from chapel for a term must be made within the first two weeks of that term.

In the determination of a student's general standing, marks for chapel attendance are counted as the equivalent of a one hour per week recitation. They affect the granting of scholarships and the selection of honor men.

Conditions. Students admitted with entrance conditions must remove them not later than the March examinations. Those who fail to meet this requirement are classed as irregular students. Those who fail to remove all entrance conditions before the beginning of the next college year will not be admitted to any of the work of that year. No student who has any conditions unsatisfied at the close of the conditions examinations in

September at the opening of the college year, is permitted to continue with his class without the express authorization of the faculty.

Conditions not removed at the next conditions examination held after their imposition must be made up in class at the first opportunity, and this work takes precedence of the regular work in case of conflict in the schedule. No senior who has failed to make up all his back work by the end of the second term of senior year can be recommended for a degree, except by special vote of the faculty.

Examinations for the removal of conditions occur on the Saturday next preceding the opening of the fall term, and on the first Friday and Saturday in December, March and May, as indicated in the college calendar. Registration for these examinations closes at 12 M. on the Saturday next preceding the date set for each. A fee for each examination to be taken must be paid at the time of registration, at the college office.

Students who have been excused by the dean, in writing, from any term examination are reported "Not examined" and may be examined later, at a time to be approved by the instructor, but such examination cannot be postponed beyond the first conditions examinations after such report. A failure to pass is regarded as a condition and must be made up at the next following conditions examination.

Unless excused in writing by the dean, students absent from term examinations are reported as "Not sustained," or "Failed."

Absence from any appointed examination is regarded as a failure, unless previously excused.

Irregular Students. Students who are seriously deficient in standing may be dropped to a lower class, or if the deficiency is such as to leave a prospect of regaining class standing, may be rated as irregular students. Irregular students have no class relation or class privilege; they are debarred from competition for prizes and from the attainment of special honors.

The evidence that a student's continuance in college is resulting in no advantage to himself, or in harm to others, will occasion his separation from the institution.

EXPENSES

Registration fee	\$5.00
Tuition, A. B., Ph. B. and B. S. courses, per term.....	30.00
Tuition, engineering courses, per term.....	50.00
Graduate courses in engineering, per term.....	25.00
Room rent in dormitories, per term.....\$20 to	25.00
Incidental fee, for maintenance of grounds and public rooms, use of library, gymnasium, etc., per term.....	8.00
Graduation fee, including diploma.....	15.00
Chemical laboratory fees:	
Courses 1 and 1a, per term.....	8.00
Courses 2, 2a, 3, 4 and 5, per term.....	15.00
Course 6, per term.....	20.00
Electrical laboratory fees:	
Junior year, per term.....	7.00
Senior year, per term.....	10.00
Biological laboratory fees:	
Courses 1 and 5, per term.....	2.00
Course 4, per term.....	6.00
Physics laboratory fees:	
Course 1a, per term.....	4.00
Course 2, per term.....	5.00
Conditions examination fee	2.00
Fee for certificate of work done.....	2.00
Master's degree, registration and diploma.....	20.00

In the course leading to the degree of Doctor of Philosophy the maximum payment will be \$300 if the degree be earned in five years from the time of registration.

Students who take their senior year's work at the Albany Medical College as provided on page 28 are charged \$125 for the year's tuition, \$50 to be paid to the treasurer of Union College and \$75 to the treasurer of the Albany Medical College.

Tuition and other fees are due in advance on the first day of each term, and are not returnable.

Students must conform to the rules of the treasurer's office regarding registration at the opening of each term, and will

not be admitted to any classes or laboratories until the required fees are paid.

No deductions are made because of absence from college.

No part of a term bill will be refunded for any cause.

Damage done by students to college property will be charged to their account.

No degree, certificate or dismissal will be given to any student until his bills are paid.

Board can be procured for \$3.50 to \$5 a week.

It is the custom of the student body to levy an annual campus tax of sixteen dollars, six dollars of which is payable at the beginning of the fall term, five dollars at the beginning of the winter term, and five dollars at the beginning of the spring term. This money is used for the support of the different branches of athletics and of the musical association.

College Rooms

The college has three steam-heated dormitories. Most of the rooms are arranged in suites of two, and are all unfurnished; they are rented at prices varying from \$60.00 to \$90.00 per year for each student occupying a room. Students about to enter college who wish rooms in the dormitories should make early application to the assistant treasurer for a list of rooms giving location and price. No room is secured until a lease is signed and filed in the college office; a student must occupy the room for which he signs, as transfers are not allowed. The rooms are cared for by competent persons, employed and paid by the college; each occupant of a college room will be held responsible for any damage done to the room. At the end of the college year students giving up their rooms for any reason whatsoever must remove all furniture and property from their rooms not later than the Saturday following commencement day, as after this time the dormitories will be closed until the Saturday before the first registration day of the fall term. The dormitories will also be closed during the Christmas recess.

Students leaving property in their rooms during the vacations do so at their own risk.

The Union College Christian Association offers its services to students who find it necessary to secure rooms in the city.

The association inquires into the character of all places offered as lodgings for students, and, shortly before the beginning of the college year, provides a list of approved places.

Employment Bureau

The Christian Association acts as a bureau with the object of giving assistance to students who desire employment for the purpose of meeting the expenses of a college education. It has been found that many opportunities for work exist in Schenectady by which students may earn from \$2 to \$4 per week, during term-time, without seriously interfering with their college studies. A considerable number of students meet the expense of board by acting as waiters in the various restaurants and boarding houses in the city. Others find employment as clerks in stores on Friday evenings and Saturdays; others in caring for furnaces and in other work about private residences. Applications for the assistance of the bureau may be addressed to the secretary of the faculty.

SCHOLARSHIPS

Funds given especially for this purpose enable the college to offer aid to a number of students each year, as follows:

General Scholarships. General scholarships are available for students in the A. B., Ph. B. and B. S. courses.

Scholarships covering a part or the whole of the tuition charges are granted to students upon the following conditions:

1. The declaration of a purpose to remain in Union College until graduation.

2. An acknowledgment that the aid received is regarded as a debt of honor, to be paid as soon as possible after leaving college.

3. The presentation of satisfactory evidence of financial need.

Scholarship aid will be withdrawn temporarily upon the failure of the student to be sustained in any subject, or upon his failure to maintain an average grade of eighty per cent. in the studies of any term, and after it has been withdrawn for three successive terms it will not be renewed.

Any serious breach of college discipline, evidence of moral delinquency, or repeated unnecessary expenditures will also result in the withdrawal of scholarship aid.

Credentials necessary for admission to another college will not be given to any scholarship student until he has repaid to the college treasury the full amount of scholarship aid received.

Application blanks will be provided by the secretary upon request.

John David Wolfe Memorial Scholarships. The income of a fund of fifty thousand dollars established by the generosity of Miss Catharine Lorillard Wolfe is designed to aid students from the southern states.

These scholarships are available for students in all courses and are governed by the conditions named above.

Application blanks will be provided by the secretary upon request.

Levi Parsons Scholarships

A generous benefaction by the late Hon. Levi Parsons, of Gloversville, N. Y., maintains several scholarships in each class, yielding at least one hundred and fifty dollars a year each.

Among applicants, preference is given:

First, to blood relatives of the founder, bearing his name and living in the county of Fulton, Montgomery or Hamilton, in the State of New York, and especially to those bearing his name and living in Gloversville or Johnstown, Fulton county.

Second, to applicants living in the following places, according to the following order:

1. The city of Gloversville, Fulton county.
2. The city of Johnstown.
3. The township of Johnstown.
4. The county of Fulton.
5. The adjoining counties of Montgomery and Hamilton.
6. The blood relatives living in any other part of the United States.

Nomination to scholarships is made by the board of directors of the Gloversville Free Library; and the nominees must satisfy the college requirements for admission. Applications are received by the directors of the Gloversville Free Library, Gloversville.

The continuance of these scholarships is subject to the rules stated on page 132 concerning the withdrawal of the general scholarships of the college.

Thomas Armstrong Scholarships. The late Thomas Armstrong, of Plattsburg, N. Y., provided for the grant of scholarships to residents of Clinton county, sons of practical farmers.

Nominations to these scholarships are made by the board of supervisors of Clinton county, and the yearly value of each scholarship is not to exceed two hundred dollars.

Application blanks will be provided by the secretary upon request.

R. C. Alexander Prize Scholarship. The sum of four thousand dollars has been given in memory of the late Robert Carter Alexander, of the class of 1880, and a life trustee of the College,

to be devoted to the establishment of a scholarship for the encouragement of classical studies.

The income of this fund, amounting to two hundred dollars per year, is awarded as a prize scholarship, upon the following conditions:

1. Candidates must be students in the classical course, and of approved moral character.

2. They must be free from conditions and must have obtained an average of at least eighty per cent. in the studies of the first two terms of the freshman year.

3. They must pass successfully a special examination at the close of the freshman year in each of the following subjects: Latin, Greek, mathematics, English composition, and either French or German. These examinations will be based upon the work of the freshman year.

4. The award will be made to the candidate obtaining the highest general average in these examinations and in all the previous work of the college course.*

5. The prize scholarship will be forfeited upon evidence of moral delinquency, or upon failure to maintain an average grade of ninety per cent. in the work of any subsequent term. The scholarship, once lost, cannot be regained, but will be awarded, upon the above conditions, to a student in the next entering class.

6. All questions pertaining to the administration of this scholarship will be determined by a committee composed of the president of the college, the chairman of the scholarship committee of the faculty, and a member of the board of trustees.

Horace B. Silliman Scholarships. Three scholarships were founded by the late Horace B. Silliman, of the class of 1846, giving to each recipient the income from two thousand dollars annually.

These scholarships are awarded to active members of the college Young Men's Christian Association by a committee composed of the president, the dean, and the president of the Young Men's Christian Association, under such rules and conditions as

*This scholarship is now held by Donald A. Coulter, of the class of 1915.

may be determined by such committee, preference being given to students in the classical course.

The award is made to one student annually at the close of the freshman year.

Daniel F. Pullman Scholarship. The late Daniel F. Pullman, of Knox, Albany county, New York, provided in his will for the establishment of a scholarship of the value of \$120 a year, to be given to a student in the classical course.

The award is made by the faculty, and in accordance with the terms of the will preference is given to members of the Methodist Episcopal Church.

Alumni Scholarships. Application for appointment to these scholarships must be made before September 1. The conditions with respect to college standing governing the award of the general scholarships of the college apply to this scholarship also.

Class of 1895 Scholarship. A fund has been given by the class of 1895 which provides for the grant of a scholarship of a yearly value not to exceed one hundred dollars.

The award is made by the faculty and, in accordance with the wish of the donors, preference will be given to descendants of members of the class.

Graduate Council Scholarships. A fund is given by members of the class of 1887 which provide for two scholarships of the yearly value of one hundred dollars each. These scholarships are subject to the general rules of the college as regards class standing and personal conduct. (Page 132.) The award is made by the donors on nomination by the secretary of the council.

Daniel Vedder Scholarship. By the will of the late Daniel Vedder, of Schenectady, a scholarship has been established, of the annual value of two hundred dollars.

The scholarship is awarded by the faculty, and is given to a student who is preparing to enter the Christian ministry.

The holder must maintain an average standing of ninety per cent., and must pledge himself to abstain from the use of intoxicating liquors and tobacco.

If none of the candidates meets in every respect the conditions stated in the will of the donor, the scholarship will be awarded in such a way as to carry out as fully as possible the wishes of the founder.

The award is made at the end of the freshman year.

Ichabod Spencer Scholarship Fund. The sum of four thousand dollars, to be known as the Ichabod Spencer Scholarship Fund and to be used for general scholarship aid, has been given by Mrs. Catherine Spencer Leavitt in memory of her father, the Rev. Ichabod Spencer of the class of 1822. The proceeds of this fund are used at the discretion of the trustees to aid worthy students in securing an education at Union College.

Law School Scholarships. Applicants for these scholarships, described below, must register at the college office by May 1st of senior year.

John K. Porter Memorial Scholarship. A fund given by Mrs. John K. Porter, in memory of her husband, is designed to assist students who, after graduating from college, pursue the study of law. The fund provides, at present, for three scholarships of ninety dollars each. The awards are made at commencement to seniors chosen by the faculty.

Gilbert M. Spier Memorial Scholarship. A fund given by Mrs. John K. Porter, in memory of her father, the late Judge Gilbert M. Spier, provides another scholarship for students of law who go from Union College to the Albany Law School, another department of Union University. The sum of ninety dollars is awarded at commencement to the senior chosen by the faculty, the choice being made on the basis of excellence in historical studies.

Erie County Scholarships. Through the generosity of Mr. Thomas B. Lockwood of Buffalo, Union College is enabled to offer a certain number of scholarships annually to graduates of registered high schools in Erie county.

The tenure of the scholarships is subject to the general scholarship rules of the college as published in the annual catalogue.

Chester C. Thorne Scholarship. The late Rev. Chester C. Thorne, of the class of 1857, has endowed a scholarship of the annual value of two hundred dollars. The scholarship will be awarded to a student in one of the academic courses at the end of his junior year; it is given on the basis of character and financial need and is awarded by the faculty.

The tenure of the scholarship is subject to the general scholarship rules of the college as published in the annual catalogue.

Genesee Valley Scholarships. The Alumni Association of the Genesee Valley generously offers a scholarship to residents of towns included in the active membership of the association.

The tenure of the scholarship is subject to the general scholarship rules of the college as published in the annual catalogue.

PRIZES

The following prizes are awarded from funds given especially for this purpose:

Blatchford Oratorical Medals. The Hon. Richard M. Blatchford, LL. D., of New York city, founded oratorical prizes, consisting of two gold medals of the value of the interest on \$1,000, which are given to the two members of the graduating class who deliver at commencement the best orations, "regard being had alike to their elevated and classical character and to their graceful and effective delivery." These medals are awarded by a committee appointed by the trustees, and are presented at the close of the exercises.

Warner Prize. The Hon. Horatio G. Warner, LL. D., of Rochester, N. Y., founded an annual prize to be presented at commencement to the "graduate of Union College, classical or Latin-scientific course, who shall reach the highest standing in the performance of collegiate duties, and also sustain the best character for moral rectitude and deportment, without regard to religious practice or profession." The prize is a silver cup and is awarded by the faculty.

Ingham Prize. The Hon. Albert C. Ingham, LL. D., of Meridian, N. Y., founded an annual prize of the interest of \$1,000 (in the form of plate, or medal, or money, or both medal and money, as preferred), to be awarded at commencement to that senior connected with the college for not less than two years who shall offer the best essay on one of two assigned subjects in English literature or history.

The essay must be typewritten, and must contain not less than 4,000 nor more than 4,500 words. Its signature (fictitious) and the writer's real name must be enclosed in a sealed envelope; the signature and the name of the prize being given on the outside. The essay, with the note, must be presented by noon on the first day of May.

Allen Essay Prizes. The Hon. William F. Allen, LL. D., of Oswego, N. Y., established a fund of \$1,000, the interest of which

is devoted to prizes for the best three essays on any subject, submitted by members of the senior class.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham essay) by noon on May 1st. The prizes are awarded at commencement.

Oratorical Prizes. Prizes are presented at commencement to the two juniors and the two sophomores who deliver the orations best in composition and delivery on the occasion of prize speaking in commencement week. Four juniors and four sophomores are selected for this competition by a committee of the faculty on the fifteenth of April. Candidates must be in full standing on appearance before the committee.

Allison-Foote Prizes. Mr. George F. Allison, of New York city, and the late Wallace T. Foote, of Port Henry, N. Y., founded a prize for the encouragement of debate in the literary societies. The prize consists of \$100 in cash, and is awarded as the result of a public competition between representatives of the Adelpic and Philomathean Literary Societies. Fifty dollars is awarded to the society presenting the strongest argument. The remaining \$50 is awarded to the debater who makes the best single speech, regardless of his society relations. Contestants must have engaged in at least ten debates in their respective societies during the college year immediately preceding. All further details are left to the determination of a committee, consisting of the president, the dean of the college, and the professor of Rhetoric.

Daggett Prize. In 1899 Miss E. Josephine Daggett bequeathed to Union College the sum of \$1,000, the interest of which is devoted to a prize for conduct and character, without respect to scholarship, to be given at Commencement to a senior who shall have passed through a full course of four years at the college.

Pullman Prizes. Mr. Daniel F. Pullman, of Knox, Albany County, New York, bequeathed to Union College the sum of \$2,000 to found two annual prizes. In awarding both prizes, preference is given to members of the Methodist Episcopal Church.

The Pullman Classical Prize. This prize of \$40 is given to that

member of the graduating class who, in an attendance of three years, has attained the highest standing in scholarship in the classical course.

The Pullman Engineering Prize. This prize of \$40 is given to that member of the graduating class who has taken the full course in the engineering department and who has attained the highest standing in that course.

Baggerly Prizes. Mr. H. L. Baggerly, of the class of 1894, has founded two prizes to be offered annually for the best essays on a question of economics or government. The topic is announced at the beginning of the winter term. The prizes are of \$60 and \$40, and are open to competition by members of the senior and junior classes.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham and Allen essays) by noon on May 1st.

The award is made by a committee of the faculty.

Bailey Prize. A silver cup, of the value of \$50, has been offered by Dr. Frank Bailey, to be awarded annually to that member of the senior class who has rendered the greatest service to the college in any field. In awarding this prize, consideration will be given to any effort resulting in conspicuous improvement in the conduct of athletic sports or in the character of undergraduate publications; in the increase of college enthusiasm or the elevation of the tone of college life; in the advancement of the interests of the college among preparatory schools or in the community as a whole; or in any addition to those things which bring honor to the name of Union.

Van Orden Prize. The Van Orden Prize was founded by the late Wessel Ten Broeck Van Orden in memory of his uncle, Wessel Ten Broeck Van Orden, of the class of 1839. It is awarded annually to a member of the freshman class for excellence in English composition. The basis of the award is the class work in rhetoric and composition, and a special essay. The essays are based upon certain works of English literature, the titles of

which are announced early in the fall. The prize is the interest on \$1,000, and is awarded partly in books and partly in money.

Goodrich-Duane Prizes. Two prizes, of \$30 and \$20, are awarded to the best speakers in an extemporaneous debate held in commencement week in each year. A general topic is previously announced, and the particular subject of debate is given on the evening of the contest. The competition is open to students of all classes.

The first prize is given by Mr. James A. Goodrich, of the class of 1879, and the second prize by Dr. Alexander Duane, of the class of 1878.

Beukendaal Prize. A prize of \$25 is offered by the Beukendaal Chapter of the National Society of the Daughters of the American Revolution to be awarded to the student in American history who most successfully meets the conditions announced at the beginning of the course in the fall of each year.

American History Prize. A prize of \$25 has been offered by Willis T. Hanson, Jr., A. M., for the best thesis on a topic dealing with the history of Schenectady.

The essays must be typewritten in duplicate and must contain not less than 4,000 words. Both copies must be submitted not later than May 1st to the head of the Department of History. The award will be made under the direction of this department, preference being given to theses based upon original sources.

Debate Medals. Intercollegiate debate medals are awarded by the Union College Debating Council each year to those students who worthily participate in at least two intercollegiate debates during the academic year.

Underclass Debate Prize. A prize of \$10 is awarded to the member of either debating teams in the Sophomore-Freshman debate who makes the best single speech, regardless of class victory.

Ernst J. Berg Scholarship Cup. A silver cup is offered by Dr. Ernst J. Berg, to be awarded at the opening of the fall term, to that fraternity or like organization whose scholarship during the preceding year was highest.

DEGREES AND HONORS

The candidate for a degree must have paid all dues to the college treasurer, and returned all books borrowed from the college library; he must also attend the conferring of degrees, or be expressly excused therefrom. The candidate for a bachelor's degree must have entered college not later than the beginning of the first senior term.

Degrees for Resident Study

The degrees of the college are conferred by authority of the board of trustees upon candidates who have successfully completed courses of resident study, as follows:

The Bachelor's Degree. The degree of Bachelor of Arts (A. B.) will be conferred upon candidates who have successfully completed Course 1, page 28; the degree of Bachelor of Philosophy (Ph. B.), upon those who have successfully completed Course 2, page 28; the degree of Bachelor of Science (B. S.), upon those who have successfully completed Course 3, page 28; the degree of Bachelor of Engineering (B. E.), upon those who have successfully completed Course 4, first, second or third division, pages 28-29.

The Master's Degree. The degree of Master of Civil Engineering (M. C. E.) will be conferred upon candidates who have successfully completed Course 6, first division, page 29; the degree of Master of Science in Electrical Engineering (M. S. in E. E.), upon those who have successfully completed Course 6, second division, page 29.

The Doctor's Degree. The degree of Doctor of Philosophy (Ph. D.) will be conferred upon students of electrical science who fulfill the requirements stated on pages 115-116.

Degrees for Non-Resident Study

The following degrees for non-resident study may be conferred upon graduates of Union College who meet the requirements specified below:

Academic Degrees. The degree of Master of Arts (M. A.) or

of Master of Science (M. S.) will be given to graduates of Union College who have been registered as candidates for the degree not less than two years, have completed definite courses of advanced study in two departments, and have submitted a satisfactory thesis and passed satisfactory examinations. The total amount of work done is intended to be the equivalent of one year of resident study.

A year of resident study in any non-professional graduate school, approved at the time of registration by the two departments concerned, will be accepted instead of the two years' study above mentioned on fulfillment of the same conditions regarding thesis and examinations.

Each candidate for this degree must register with the dean of the college his name, his address, and the two departments chosen, not later than the fifteenth of October of the year for which he desires registration.

The thesis must be presented to the dean by May first for submission to the faculty in time to provide for all necessary examinations before commencement.

A fee of \$20 is charged, which covers examinations and diploma; of this amount \$10 is payable at the time of registration and \$10 at the time of the final examinations.

Engineering Degrees. On fulfilling the conditions prescribed below graduates of Union College in the general and sanitary engineering courses may become candidates for the degree of Civil Engineer (C. E.); graduates in the course in electrical engineering may become candidates for the degree of Electrical Engineering (E. E.)

The candidate, after the completion of his undergraduate course must have been engaged for at least three years in professional engineering work of a high order and in positions favorable to the acquisition of valuable engineering experience and to the development of professional ability and judgment.

If the candidate's professional experience is found adequate in character and amount, he is required to submit a satisfactory thesis on an approved subject embodying a contribution by himself to engineering knowledge or literature.

If the thesis is found satisfactory the candidate may be called before an examining committee selected by the department in which he is a candidate and must satisfy the committee that his training, experience, judgment and ability are such as to warrant the conferring of the degree.

If, in the opinion of the head of the department concerned, the candidate has satisfactorily met the above requirements he may be recommended for his degree, to be conferred by the trustees at the following commencement.

The diploma fee for this degree is \$10.

Honors

All commencement prizes are limited to A. B., Ph. B. or B. S. students who have entered at or before the beginning of the senior year, and who are in full standing at the close of the second term; and to engineering students entered likewise and in full standing at the close of the second term, in both the engineering course and the English department of the B. S. or Ph. B. course.

Commencement Appointments. These honors are assigned to ten seniors, five from the academic course and five from the engineering courses, on the basis of scholarship, as stated under Standing, page 129. Provisional appointments are made at the close of the second term senior, and become final if those who receive them return the same relative rank to the end of their course. Under present regulations, no other person can become competitors for the Blatchford Oratorical Medals.

Seniors not in full standing at the close of the second term are ineligible to a Commencement appointment.

Students who receive Commencement appointments as the result of the third term's work are excused from speaking unless the faculty direct otherwise.

The Valedictory. This honor is awarded to the senior of highest standing among the ten receiving Commencement appointments.

Special Honors. Special honors are also given at graduation under the following conditions: Any department may offer a

course, approved by the education committee, leading to special honors. The head of a department may direct the choice of electives in other departments, for honor students, to the number of six hours in each year. The time of registration for honors will be determined separately for each department. The candidate for special honors must have attained in all the studies of the department in which he tries for honors a rank of not less than ninety per cent. of the maximum. The evidence that he has successfully completed the extra course prescribed for him must be submitted not later than June 1st of the senior year to the faculty, who shall decide in each case whether the work is worthy the names of the students who take honors are printed on the of an honor. The honors attained are stated in the diploma, and Commencement programme. No student may try for honors in more than two departments.

Phi Beta Kappa. At the end of the third term of the senior year, one-third of the members of the graduating class in the classical course, candidates for the degree of Bachelor of Arts, may be elected to membership in the Phi Beta Kappa society. The election is based upon scholarship and character and is given, as a rule, to the men who stand highest in scholarship in their class.

The Alpha of New York chapter was established in 1817; and ever since that time election to the society has been one of the highest distinctions to be gained by scholarship.

Sigma Xi. Election to the honorary scientific society of Sigma Xi, is one of the honors open to seniors of marked ability in the scientific and engineering departments. Membership is confined to the faculty, senior candidates for graduation, and alumni. The election occurs during the latter part of the senior year and selections are made on the basis of high general scientific or engineering ability and particularly as a mark of promise of ability in research and independent work.

The society was founded at Cornell University in 1886 and has chapters at more than twenty of the leading colleges and universities of the country. The Union chapter was established in 1887, since which time about one hundred members have been elected by this chapter.

DEGREES CONFERRED
AT THE
ONE HUNDRED AND EIGHTEENTH ANNUAL
COMMENCEMENT

JUNE 10, 1914

Honorary

LL. D.

Elihu Root.....Washington, D. C.

Litt. D.

Edwin Wilbur Rice.....Philadelphia, Pa.

L. H. D.

Wallace Buttrick.....New York City

M. A.

George Candee Gale.....Galesburg, Ill.

C. E.

Richard H. Gillespie.....New York City

In Course

M. A.

John Albert Charlton Callen.....Schenectady

Frederick Thomas Dawson.....Schenectady

M. S.

Otto Jean Walrath.....Bloomfield, N. J.

M. C. E.

Charles Thomas Male.....Niskayuna

Walter von Dohlen Tiedeman.....Schenectady

M. S. in E. E.

Nicholas S. Diamant.....Constantinople, Turkey

Crosby Field Frank.....Schenectady

Herbert Kay Humphrey.....Chicago, Ill.

Richard Hale Marvin.....Jamaica

Orin Earl Shirley.....Paris, Ill.

Frank Short.....	Penn Yan
Robert Michael Spurr.....	Peoria, Ill.
Ting Tsing Woo.....	Shanghai, China

B. E.

Walter von Dohlen Tiedeman.....	Schenectady
(as of the class of 1913)	

Class of 1914**A. B.**

Jerome Doctor Guthman.....	Schenectady
Henry Herman Hitchcock.....	Cambridge
George Octavius Truex.....	Bolton Landing
Raymond Van Santvoord.....	Cohoes

Ph. B.

William Lawrence Coté.....	Warrensburg
Victor Alexander Lord.....	Schenectady

B. S.

Sidney William Bisgrove.....	Schenectady
Thomas Leland Ennis.....	Rotterdam Junction
Harry Clarkson Ewens.....	Buffalo
Arthur Leopold Hawley.....	Schenectady
John Taylor Howell, Jr.....	Newburgh
Charles Albion Kenworthy.....	Amsterdam
Alfred Cluett Meneely.....	Watervliet
William Alvin Mudge.....	Schenectady
Dalton Vane Sarvey.....	Elmira
Morris P. Schaffer.....	Schenectady
Arthur Davis Sherman.....	Albany
Charles Sherman.....	Albany
Warren Chase Vosburgh.....	Voorheesville
Morgan Leslie Williams.....	Medway

B. E.

Frank Dorn Barclay.....	Schenectady
George Sumner Bradford.....	South Gardner, Mass.
Louis Chester Case.....	Guilderland
Sidney Ferdinand Dejonge.....	Tompkinsville

Cyrus Bruce Elmore.....	Middletown
John Porter Lacey.....	Highland
George Edward Lewis.....	Marion
Arthur Leob.....	New York City
William George Lutz.....	Schenectady
Andrew Stanton McCormick.....	Boonville
Harry Froass Neumann.....	Oneida
Stephen Bond Story.....	Vernon, Conn.
William Royal Taylor.....	Schenectady
Homer Michael Tinklepaugh.....	Sodus
<hr/>	
Carlton McEwan Baldwin.....	Glens Falls
Eugene Darius Filmer.....	Gloversville
Harrison Gunning.....	Freeport
Archibald Scott Tefler.....	Harwick
<hr/>	
Luiz Morato Pinto de Almeida.....	Brazil
C. G. Harry Anderson.....	Olean
James Vincent Baker.....	Port Chester
Leon Elisha Decker.....	Fallsburg
Louis de Bois De La Vergne.....	Kingston
Eli Sarkis Eghiayan.....	Syria
Richard Williams Evans.....	Fergus Falls, Minn.
Pedro Ferraz de Andrade Netto.....	Brazil
Ernest Allen Fox.....	Gloversville
J. Gordon Gidley.....	Johnstown
Luther Alfred Hagar.....	Plattsburgh
John Alden Hall.....	Washington
Bert Martin Hubbard.....	Hudson Falls
John Vrooman Lewis.....	Schenectady
Albert Horace Marcott.....	Randolph, Vt.
Domingos Queirós de Moraes.....	Brazil
Ralph Depew Morgan.....	Buffalo
Le Roy Sand Schell, Jr.....	Schenectady
Carlos Moreira da Silva.....	Brazil
Walter Curtis Smith.....	Lynchburg, Va.
George Wadsworth.....	Buffalo
Stanley Lincoln Walworth.....	Binghamton
James Robert West.....	Sodus

AWARDS 1914**Valedictory**

Luther Arthur Hagar.....Plattsburgh

Commencement Orations

Jerome D. Guthmann.....Schenectady
 William Alvin Mudge.....Schenectady
 Walter Von Dohlen Tiedeman.....Schenectady
 George Octavius Truex.....Bolton Landing
 Raymond Van Santvoord.....Cohoes
 Warren Chase Vosburgh.....Voorheesville
 Luther Alfred Hagar.....Plattsburgh

Engineering Theses

Sidney Ferdinand Dejonge.....Tompkinsville
 William George Lutz.....Schenectady
 Walter Von Dohlen Tiedeman.....Schenectady
 Luiz Morato Pinto de Almeida.....Brazil
 Luther Alfred Hagar.....Plattsburgh
 John Alden Hall.....Washington

Special Honors

In Chemistry.... William Alvin Mudge.....Schenectady
 Warren Chase Vosburgh.....Voorheesville
 In Geology..... Morgan Leslie Williams.....Medway
 In Greek..... Raymond Van Santvoord.....Cohoes
 In Mathematics... Warren Chase Vosburgh.....Voorheesville
 In Philosophy.... William Alvin Mudge.....Schenectady

Prizes

Blatchford Oratorical Medals. 1st, Luther A. Hager; 2nd,
 Warren C. Vosburgh

Warner Prize. Jerome D. Guthmann

Allen Prizes. Thomas L. Ennis, Morgan L. Williams, Jerome
 D. Guthmann

Prizes for Oratory. Juniors: James Fitzgerald, Henry L. Faust. Sophomores: C. Newell Smith, Charles Foster Brown

Allison-Foote Prizes. Won by the Adelphic Society and Donald A. Coulter

Daggett Prize. Stephen B. Story

Pullman Prizes. Jerome D. Guthmann, Luther A. Hagar

Baggerly Prizes. Morgan L. Williams, Jerome D. Guthmann

Bailey Prize. John Taylor Howell, Jr.

Van Orden Prize. William Morris Gilbert, Jr.

Goodrich-Duane Prizes. Raymond S. Blodgett, Jerome D. Guthmann

Intercollegiate Debate Medals. Raymond S. Blodgett, Donald

A. Coulter, Avrom M. Jacobs, Milton H. Sternfeld

Underclass Debate Prize. Jacob Mitchell Frank

American History Prize. Karl Engle Agan

Beukendaal Prize. Karl Engle Agan

Alexander Prize Scholarship. Donald A. Coulter

Horace B. Silliman Scholarship. Wilson O. Clough

Daniel Vedder Scholarship. William Carroll Gunning

John K. Porter Memorial Scholarships. Jerome D. Guthmann, Thomas Leland Ennis, William Lawrence Coté

Gilbert M. Speir Scholarship. Morris P. Schaffer

Ernst J. Berg Scholarship Prize. The Pyramid Club

Phi Beta Kappa

Jerome D. Guthmann

Raymond Van Santvoord

Sigma Xi

John A. Hall

William G. Lutz

Burt M. Hubbard

Warren C. Vosburgh

Morgan L. Williams

ALBANY MEDICAL COLLEGE

The Medical College building, situated on Eagle street, Albany, is well appointed in its lecture rooms, laboratories, dissecting room and museums. The laboratories in chemistry and physiological chemistry are fitted with every requisite for the use of the classes and the illustration of the lectures, while the Bender Hygienic Laboratory furnishes unexcelled facilities for instruction in histology, embryology, bacteriology, pathology, experimental physiology, pharmacology and clinical microscopy.

The location of the college is such as to afford superior advantages to the student. The hospitals and dispensaries furnish an abundant supply of material for the illustration of clinical medicine and surgery, while the museums are especially rich in anatomical and pathological preparations.

The course of instruction is graded and extends over four years. The curriculum embraces lectures by professors and lecturers; recitations conducted mainly by instructors, and practical demonstrations, clinical teaching and laboratory work, in which the professors in the different departments are assisted by clinical assistants and demonstrators.

The Albany Hospital and its Tuberculosis Department, St. Peter's Hospital, Child's Hospital, St. Margaret's House, Albany's Hospital for Insurables, County Hospital, South End Dispensary, Albany Orphan Asylum and dispensaries connected with each are, by the regulation of their governing boards, made available for clinical purposes to the students, and appointments to positions on the house staffs of the hospitals in Albany and neighboring places, are annually made and are competed for by the members of the graduating class.

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 MAYOR OF ALBANY }

Catalogues are sent with care, and graduates of the college changing their post-office address, or not receiving them, will please notify

JOSEPH D. CRAIG, M. D., *Registrar*

ALBANY MEDICAL COLLEGE

Albany, New York

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Clinical Professor of Surgery

ALVAH HARRY TRAVER, M. D.

Clinical Professor of Surgery

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Adjunct Professor of Physiology

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Adjunct Professor of Physiological Chemistry and Experimental Pharmacology

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ASSISTANT REGISTRAR
Lecturer on Organic Chemistry

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Lecturer on Materia Medica

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Lecturer on School Hygiene

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Lecturer on Histology and Embryology

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Lecturer on Dermatology and Venereal Diseases

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Lecturer on Medicine

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MALCOLM DOUGLAS, M. D.
Lecturer on Medicine

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Lecturer on Medicine

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LEROY SOLOMON BLATNER, D. D. S.
Instructor in Oral Pathology

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NELSON KAUFMAN FROMM, M. D.
Instructor in Medicine

TIFFANY LAWYER, M. D.
Instructor in Gynecology

EDWIN LYON DRAPER, M. D.
Instructor in Surgical Pathology and Surgery

WILLIAM GEORGE KEENS, M. D.
Instructor in Diseases of Throat and Nose

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Instructor in Medicine

JOSEPH AMBROSE COX, M. D.
Instructor in Surgery

JOHN FORREST SOUTHWELL, M. D.
Instructor in Surgery

THOMAS WILLIAMS JENKINS, M. D.
Instructor in Histology

DAVIS BAKER, M. D.
Instructor in Surgery

CHARLES FREDERICK MYERS, M. D.
Instructor in Histology and Embryology

LOUIS BURGH MOUNT, M. D.
Instructor in Dermatology

WILLIAM DAVID ALDRICH, M. D.
Instructor in Surgery and Genito-Urinary Surgery

- ARTHUR EMERSON PITTS, M. D.
Instructor in Surgery
- LEMUEL WHITTINGTON GORHAM, M. D.
Instructor in Medicine
- MARCUS DENNIS CRONIN, M. D.
Instructor in Surgery
- ARTHUR BURTON VAN LOON, M. D.
Instructor in Surgery
- JOSEPH PATRICK O'BRIEN, M. D.
Instructor in Medicine
- MORRIS BRYAN BEECROFT, M. D.
Instructor in Bacteriology and Pathology
- GEORGE VICTOR GENZMER, M. D.
Instructor in Bacteriology and Pathology
- CLARENCE EDMOND MULLENS, M. D.
Instructor in Materia Medica
- WILLIAM CARL RAUSCH, JR., M. D.
Instructor in Obstetrics
- GARRET MARCELLUS CLOWE, M. D.
Instructor in Physiology
- JOSEPH HENRY BOWERS, M. D.
Instructor in Obstetrics
- FRANK VANDER BOGART, M. D.
Instructor in Pediatrics

Special Lecturers

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State Commissioner of Health
- LINSLEY R. WILLIAMS, M. D.
Deputy Commissioner of Health
- AUGUSTUS B. WADSWORTH, M. D.
Director Division of Laboratories and Research, State Department
of Health
- CRESSY L. WILBUR, M. D.
Director Division of Vital Statistics, State Department of Health
- C. E. A. WINSLOW
Professor of Biology, College of the City of New York

Clinical Assistants

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LOUIS LEBRUN, M. D.	JOHN L. EDWARDS, M. D.
GEORGE S. MUNSON, M. D.	WILLIAM P. HOWARD, M. D.
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AGNES E. PAGE, M. D.	JAMES I. SCHOONMAKER, M. D.
GEORGE W. PAPEN, JR., M. D.	FRANK A. SEARLE, M. D.
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HARRY H. DRAKE, M. D.	WILLARD E. WHELOCK, M. D.
MORRIS BELLIN, M. D.	GEORGE J. CULVER, M. D.
EDWARD L. ROBBINS, M. D.	

CALENDAR

1914

Regular winter session begins.....Tuesday, September 22
 Election vacation.....Monday and Tuesday, November 2 and 3
 Thanksgiving vacation begins....Wednesday at 1 P. M., Nov. 25
 Lectures resumed.....Monday morning, November 30
 Christmas vacation begins....Wednesday morning, December 23

1915

Lectures resumed.....Monday morning, January 4
 Lincoln's birthday, lectures suspended.....Friday, February 12
 Washington's birthday, lectures suspended..Monday, February 22
 Commencement.....Tuesday, May 25

REQUIREMENTS FOR ADMISSION

All matriculates must secure 60 academic counts or their full equivalent, before beginning the first annual course counted toward the degree.

When all requirements are fulfilled, the regents issue a medical student certificate which the candidate must file with the registrar of the college.

Advanced Entrance Requirements in 1914-1915

Beginning with the session of 1914-1915 candidates for admission will be required to furnish evidence of one year's work in a college or scientific school in physics, biology, inorganic chemistry and a modern language. Union College provides a collegiate year embracing these subjects. (Pages 28, 32, 78.)

Preliminary Examination. The preliminary examination of medical students is under the control of the Board of Regents of the University of the State of New York. Those contemplating the study of medicine should apply to the Examinations Division, University of the State of New York, Albany, by letter or otherwise, if information concerning this examination further than that given in the catalogue of the Medical College is desired. One of the examinations will be held in Albany, January 18-22, 1915.

Mid-Winter Written Examinations in all the departments are held in January. A printed schedule of these examinations is furnished the class.

COURSE OF INSTRUCTION

The four-year graded course required of all candidates for the degree of Doctor of Medicine embraces the following subjects:

First Year

1. **Anatomy.** Four lectures; twelve hours dissection.
2. **Histology and Embryology.** Two lectures; four and a half hours laboratory.
3. **Organic Chemistry and Toxicology.** Six lectures.
4. **Physiology.** Two lectures; one recitation.

Second Year

1. **Physiology.** One lecture; one-half hour recitation; nine hours laboratory.

2. **Physiological Chemistry.** Three lectures; six and a half hours laboratory.

3. **Bacteriology.** Three lectures; nine hours laboratory.

4. **Pathology.** Three lectures; ten hours laboratory.

5. **Theory and Practice.** Two lectures; one recitation.

6. **Materia Medica.** Two lectures; one recitation.

7. **Surgery.** Two lectures and demonstrations.

8. **Anatomy.** Three lectures; two and a half hours laboratory (first term); one recitation.

9. **Experimental Pharmacology.** Two hours lecture and demonstration.

10. **Physical Diagnosis.** One hour exercise.

Third Year

1. **Theory and Practice.** Four lectures; two recitations; two clinics.

2. **Clinical Microscopy.** Two hours laboratory.

3. **Therapeutics and Electro-therapeutics.** Two lectures; one recitation.

4. **Obstetrics and Gynecology.** Three lectures.

5. **Pediatrics.** Two lectures; one recitation half the term.

6. **Neurology.** One lecture; one recitation half the term; one clinic.

7. **Surgery (including operative, fractures, dislocations).** Four lectures; one recitation; three hours clinics.

8. **Physical Diagnosis.** Section work two hours.

9. **Medical Jurisprudence.** One lecture half the term.

10. **Hygiene.** Two lectures.

11. **X Rays.** One demonstration half the term.

12. **Ophthalmology, Dermatology, Laryngology and Otology.** Two hours; clinical work in dispensaries, four hours.

Fourth Year

1. **Theory and Practice.** Two lectures; one recitation; three hours clinics.

2. **Neurology.** One lecture; one clinic.

3. **Gynecology.** One lecture half the term.
4. **Obstetrics.** Two and a half lectures.
5. **Surgery (including Orthopedics).** Four lectures; one recitation; three hours clinics.
6. **Specialties.** (In sections.) Seven hours; one recitation.
7. **Conferences.** One medical; one surgical.
8. **Clinical work.** (In groups.) Ten hours.

The order of instruction for the ensuing session will be found in the catalogue of the Medical College, and may be obtained by application to the registrar.

Laboratories

Analytical and Toxicological Chemistry. The chemical laboratory is well furnished, conveniently arranged and supplied with all necessary apparatus.

Physiological Chemistry, Experimental Physiology and Experimental Pharmacology. The physiological chemistry is taught throughout the second year. The laboratory is equipped with sufficient desks and apparatus to give the men opportunity for developing technique in chemical work.

The experiments cover the usual subjects, of constituents of protoplasm, tests for these, chemical mechanisms involved in digestion, absorption and metabolism. An attempt is made to have the students appreciate thoroughly the chemical facts lying back of the usual tests that he will have to apply. The metabolism of the organism and its relation to diet are emphasized so that he will be in a measure prepared for the problems of pathological dietetics.

The work in experimental physiology is given during the second year at the Bender Laboratory.

As the experiments are performed very largely on mammals it is necessary to divide the students into groups, and each group is responsible for the satisfactory completion of the assigned experiment. In order to economize time and effort, the group is so organized that a rotation of duties results. In this way each man receives training in all the details of physiological work.

The experiments are planned with the end in view of giving the students a thorough grounding in the large problems of how the organism co-ordinates and integrates all the specific activities into a workable machine. The points at which this co-ordination is capable of being affected by drugs and other means are considered. The desire is present to give the men such a comprehensive grasp of the mechanism of physiological action that the sole and unthinking acceptance of therapeutic measures will be unnecessary. Finally such a course gives an opportunity for development of a technique in handling living issues that ought to be extremely helpful in future hospital training.

The course in experimental pharmacology consists of lectures, laboratory work, demonstrations and discussions. As presented, this course is very closely allied to experimental physiology. The nerve mechanisms and the normal processes taking place in the different organs or the body are first considered, followed by a study of the changes in these normal processes brought about by drugs. In this way the fundamental basis of the action of drugs is clearly demonstrated.

Anatomy. The dissecting and demonstration laboratories and the recitation rooms are well lighted and equipped and an ample supply of carefully prepared material is available. An endeavor is made to make the entire course in anatomy practical, consistent and useful, and to assist the student in laying a broad foundation of anatomical knowledge on which to build future courses in didactic and clinical medicine and surgery.

Histology, Embryology, Pathology, Bacteriology and Clinical Microscopy

Work in these departments is carried on in the Bender Hygienic Laboratory, on South Lake avenue, near the Albany Hospital.

This building was erected by the late Matthew W. Bender of Albany, and is thoroughly equipped with the apparatus necessary for the study of histology, pathology, bacteriology and clinical

microscopy. Practical work in these branches is obligatory upon all students, and abundant opportunity is furnished in the laboratory for acquiring a thorough knowledge of these important subjects. An electric lantern which is adapted to the projection of pictures and microscopic preparations as well as lantern slides is used to supplement the more practical methods of demonstration.

Histology. The work consists of explanatory talks covering the subject of the day's study, followed by practical exercises in the laboratory.

Embryology. The star-fish egg is studied for early segmentation stages; gross and microscopic examination of a series of hen's eggs for formation of germ layers and development of the nervous and vascular systems. In a similar way the embryo of the pig is used for the development of the organs which is taken up again, according to the plan of Lewis, when each organ is studied histologically.

Bacteriology. The work consists of lectures followed by practical laboratory exercises. It is intended to render the student familiar with the underlying principles of bacteriology and their application to clinical medicine and surgery.

Pathology. The work consists of a short lecture on the subject under discussion for the day followed by practical exercises in pathological anatomy and histology. Besides this the students are instructed in the technique of making autopsies and examine material from autopsies and surgical operations. Demonstrations in experimental pathology are introduced whenever possible.

Clinical Microscopy. The course consists of preliminary talks followed by practical work in the examination of blood, urine, sputum, fæces, stomach contents, exudates, etc.; and includes a short course in clinical bacteriology.

Clinical Pathology. In this course histories of clinical cases are discussed. Pathological material bearing on these cases are given for gross and microscopic study.

In all these courses the student is taught independent methods

of work and is required to keep a permanent record, illustrated by drawings, of all laboratory exercises.

A limited number of students who have shown proper aptitude are offered the opportunity to work along more advanced lines.

For the alumni of this school, and for the profession at large, this laboratory offers excellent facilities for bacteriological and pathological examination of specimens, and for the examination of urine, sputum, and blood, including the Wasserman-Noguchi reaction. Information regarding such examinations may be obtained by communicating with Dr. Ellis Kellert, Director, Bender Laboratory, South Lake avenue, Albany.

Practical Clinical Courses

In order to familiarize students with the practical work of their profession, and to bring them into closer personal contact with patients, the fourth year class is divided into sections of four men, and on four days in each week each man devotes the greater portion of the day to the examination and personal observation, under the supervision of the instructors, of patients in the wards and out-patient departments of the various hospitals and dispensaries. In this clinical work special attention is devoted to the complete examination of the blood, urine, sputum and stomach contents, as well as to the special examination of the eye, ear and other organs. Thus in the course of the school year the men in each section acquire practical knowledge and technical diagnostic dexterity in general medicine, general surgery, gynecology, dermatology, neurology, insanity, otology, laryngology, ophthalmology, rhinology, diseases of children and infants, infant feeding, diseases of the rectum and genito-urinary tract, operative surgery, orthopedic surgery, clinical and operative obstetrics, electrotherapeutics and medical technic.

FEES AND EXPENSES

Fees, excepting the final examination fee, are payable each year in advance, are not returnable, and are as follows:

First Year

Matriculation	\$5 00	
Lecture Course	125 00	
Chemical Laboratory	10 00	
Histological Laboratory	10 00	
Dissection (including material)	10 00	
	<hr/>	\$160 00

Second Year

Matriculation	\$5 00	
Lecture Course	125 00	
Bacteriology and Pathological Laboratory	20 00	
Physiological Chemistry and Experimental Physiology	15 00	
	<hr/>	\$165 00

Third Year

Matriculation	\$5 00	
Lecture Course	125 00	
Clinical Microscopy and Pathology	15 00	
	<hr/>	\$145 00

Fourth Year

Matriculation	\$5 00	
Lecture Course	125 00	
Final examination	25 00	
	<hr/>	\$155 00
		<hr/>

In addition to the fees above stated, an annual charge of two dollars is made to members of the first, second and third year classes taking laboratory courses at the Bender Laboratory, for the use of microscopes and other apparatus. This fee is paid to the director at the laboratory, and after laboratory tickets have been issued by the registrar. For the laboratory work in physiological chemistry there is a fee of two dollars to cover use of apparatus and breakage payable to the director at the beginning of the session.

All fees are payable strictly in advance except that the final examination fee may be paid at any time before the examinations begin. Students from other colleges applying for admission to advanced standing will be required to pay the matriculation fee and also five dollars for each department in which they may be

examined. Graduates of the school may attend lectures and stated clinics without charge except for matriculation in case of prolonged attendance.

The cost of living in Albany is less than in most other cities of its size. A list of boarding places, at which good rooms and board can be obtained at from four to five dollars a week or upwards, is kept by the janitor, and also at the Students' Club, and by clubbing together students can live comfortably at still lower rates. No estimate can well be made of cost of text-books and other personal expenses, since those of necessity vary greatly in different cases.

REQUIREMENTS FOR GRADUATION

The candidate must be twenty-one years of age, and exhibit a certificate from a physician or surgeon, duly authorized by law to practice his profession, that he has studied medicine and surgery under his instruction during the period required by law in this state, and he must present evidence of having complied with the law concerning preliminary examination.

He must have attended not less than four regular courses of lectures, of which the last shall have been at this college.

Students who have attended one or more courses of lectures at other registered medical colleges may be admitted to advanced standing in this college if they submit proper evidence of such attendance and a precise statement of subjects included in Examination Departments, as given in the Medical College Catalogue, in which satisfactory final examinations have been passed, and comply with the requirements stated under Examination Rules. No credit will be given for work done elsewhere in fourth year departments.

He must be of good moral character.

He must maintain a satisfactory standing during his course and pass a satisfactory final examination in the several branches taught.

Regular and punctual attendance is required, and matriculation tickets are endorsed with attendance at the end of the term.

For catalogues or further information, address

JOSEPH D. CRAIG, M. D., *Registrar*,
Albany, New York.

ALBANY LAW SCHOOL

This school is among the oldest institutions of the kind in the country, having been established in 1851, and its graduates number many of the most successful men in the profession. It is and has been largely represented in the executive, judicial and legislative departments of this and many other states, as well as of the federal government. It became a part of Union University in 1873, and begins its sixty-fourth year as a law school with the present scholastic year. During its long and successful career it has, in common with other law schools, done much to demonstrate what was at one time doubtful, but is now accepted almost as an axiom, that a course at the law school is a well-nigh necessary prerequisite to a successful professional career. Its instructors have always been men of repute and standing, both for professional learning and personal character.

The local advantages of the city of Albany, as the seat of a professional school, can not be overrated. It is the capital of one of the leading states in the Union, whose legislature is in session here for the third part of the year, presenting opportunities not afforded by any other law school in the state for observing the methods and procedure collectively of the executive, judicial and legislative departments of the state government. The knowledge thus obtained by the students at law, who are to complete their course and to enter the realm of public affairs, can not be overestimated. It is easily accessible, remarkably healthful, and the scene of great business and professional activity.

The facilities afforded the students for reading and study are unsurpassed. Besides the convenient and well chosen library of the school accessible to the students at all hours of the day and evening, the students have the privilege of using the state law library, which is now established in the New Education Building. With free access to these libraries the student may be relieved to a great extent from purchasing text-books.

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Torts, Injuries to Property Rights

Hubbard Chair of Legal Ethics. The circulars of seventy of the leading law schools of the country show that a very few years ago only twenty of this number made the subject of legal ethics part of the curriculum. With two exceptions, those schools were either in the west or south. These facts led Gen. Thos. H. Hubbard, class of '60, to place at the disposal of the board of trustees the sum of \$10,000, the income to be applied to lectures upon this subject. The board of trustees decided to inaugurate the course at the opening of the school year of 1903 and twenty-six Lectures by as many distinguished Judges and Lawyers have been delivered up to this time.

CALENDAR

1914

Registration, first semester.....Tuesday, September 22
Scholastic year begins.....Wednesday, September 23
Election day recess.....Friday, October 30
Lectures resumed.....Wednesday, November 4
Thanksgiving recess begins, noon.....Wednesday, November 25
Lectures resumed.....Tuesday, December 1
Holiday recess begins, noon.....Wednesday, December 23

1915

Lectures resumed.....	Tuesday, January 5
Examinations.....	Thursday-Friday, January 28-29
McKinley day.....	Friday, January 29
Registration, second semester.....	Monday, February 1
Washington's birthday (Feb. 22).....	Monday, February 22
Easter recess begins noon.....	Wednesday, March 31
Lectures resumed.....	Tuesday, April 6
Memorial Day.....	Saturday, May 30
Examinations.....	Wednesday and Thursday, June 3-4
Commencement.....	Wednesday, June 9

REQUIREMENTS FOR ADMISSION AND GRADUATION

The course for graduation is now three years. Candidates for graduation from this school will be required (1) to present evidence of a general preliminary education representing at least four years, or their equivalent, of work of a grade above the elementary or grammar school before beginning the course of study; (2) to have studied law at least three full years for the degree of LL. B., each school year of which shall consist of not less than thirty-two school weeks, exclusive of vacations, in which not less than ten hours of attendance upon law lectures or recitations of such prescribed course to be given or conducted by regular members of the faculty are required in each week, unless admitted to advanced standing of one year on graduation from a registered college or university; (3) to complete the course in residence of not less than one year; (4) to be of good moral character; (5) to be at least twenty-one years of age.

EXPENSES

Matriculation fee, on entrance.....	\$10
Tuition, each year.....	110
Graduation fee	10
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For catalogues or further information address

JOHN C. WATSON, *Registrar*

Albany Law School,

Albany, N. Y.

THE DUDLEY OBSERVATORY

The Dudley Observatory is devoted to original research in astronomy, according to the purpose of its founder and successive patrons. Its contributions to science are represented in two volumes of *Annals* and in other published volumes and memoirs contained in the transactions of learned societies and astronomical journals. Its principal line of work at present is the determination of problems relating to the positions and motions of the stars and of the solar system as a whole.

The instrumental equipment of the observatory is designed for the purposes of exact measurement. In the tower of the main building is the Pruyn equatorial, with object-glass twelve inches in diameter. This instrument is equipped for both visual and photographic use, and is of a high order of mechanical perfection. The Olcott meridian circle is located in a separate building, especially designed for securing the utmost equality in the temperature between the external air and that in the building itself. Its object-glass is eight inches in diameter. It was made by Pistor and Martins, of Berlin, and is regarded by astronomers as a masterpiece of accurate workmanship. This instrument has been employed for many years in obtaining the measurements necessary for the construction of the numerous and elaborate star catalogues which have issued from the Dudley Observatory. In addition to these instruments, the observatory is in possession of various small telescopes, clocks, chronographs and smaller apparatus.

The institution is supported by an endowment, chiefly contributed by Mrs. Blandina Dudley, the late Catharine W. Bruce, and Hon. Frederic P. Olcott, as well as by appropriations which have been received from the National Academy of Sciences, and from current contributions of trustees and friends of the institution. Since 1902, annual grants have been made to the director of the observatory by the Carnegie Institution of Washington. These have been sufficient to provide for the entire force of assistants and computers now employed. In 1905, the Carnegie Institution made

special provision for carrying on the star researches upon which the observatory is engaged for a period of ten years. This includes an appropriation which enabled the observatory to send the Olcott meridian circle to the southern hemisphere for two years with an ample force of observers, in order to carry out an essential feature of its investigations.

The Dudley Observatory is not designed to give general instruction in astronomy, though special students contemplating instruction in professional lines are received under an arrangement of computing service to the observatory.

The observatory is opened to visitors on Tuesday evening.

For further particulars apply to

BENJAMIN BOSS, Acting Director

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ALBANY COLLEGE OF PHARMACY

The Albany College of Pharmacy was created by act of the board of governors of Union University, June 21, 1881, and constitutes the department of pharmacy of Union University. It was incorporated as the Albany College of Pharmacy, August 27, 1881. The college is centrally located at 43-45 Eagle street.

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HARRY WHEELER BAKER, PH. G.

Instructor in Pharmacy and Chemistry

RICHARD BERCHMANS GRAY, M. D.

Assistant in Microscopical Laboratory

MAUSER TEMPLETON STONE, PH. G.

Instructor in Pharmacy and Mathematics

LE ROY GEORGE MATHEWS, PH. G.

Instructor in Physics

FRANK POMFRET HUESTED, PH. G.

Lecturer in Physiology

CALENDAR FOR 1914-1915

1914

Opening exercises.....Monday, September 28
Examinations to pass off conditions.....Friday, September 25
Christmas vacation, begins.....Monday, December 21

1915

Exercises resumed.....Monday, January 4
Commencement.....Tuesday, April 27

REQUIREMENTS FOR ADMISSION

All applicants for admission to regular standing in this college must be at least seventeen years of age, and will be required to present a Pharmacy Student Certificate issued by the New York State Education Department. The requirement for this certificate is the completion of the first year's course in a recognized high school or academy, or evidence of an equivalent education. Inquiries concerning this preliminary requirement may be addressed to the New York State Education Department, Albany, New York.

THE CURRICULUM

The curriculum of the college embraces:

Chemistry—Theoretical, general, pharmaceutical and analytical

Botany—Structural, systematic and analytical

Materia Medica and Pharmacognosy

Pharmacy—Theoretical and Practical

Microscopy—Theoretical and practical in its relation to pharmacy

Toxicology

Pharmaceutical Mathematics

Physics

Physiology

Latin

Pharmaceutical Jurisprudence

Commercial Pharmacy

GRADUATION

The diploma of this college confers the degree of Graduate in Pharmacy (Ph. G.). Applicants for this degree must have had the required preliminary education, be of good moral character, have attended two full courses in this college, or the last course in this college and the first in some other registered college of pharmacy; have passed satisfactory examinations and paid all fees as hereafter stated.

FEES FOR TUITION**EACH YEAR**

Matriculation	\$5 00
Tuition.	85 00

SITUATIONS

Students desirous of obtaining employment while attending college will be assisted as far as possible in securing situations, but employment cannot be promised in advance, and places cannot be secured by correspondence. Personal application for employment always brings the best results. During the past several years the faculty has had a much larger number of openings offered for graduates to lucrative positions than it has been able to fill. The demand on the part of the employers for skilled assistants is steadily increasing, and a college diploma or license from an examining board is demanded by law of those who engage in the practice of pharmacy in most of the states and cities of the Union.

For separate catalogue giving more complete information address

ALFRED B. HUESTED, *Secretary*
43-45 Eagle street
Albany, N. Y.

ENROLLMENT, UNION UNIVERSITY, 1914-15

STUDENTS OF UNION COLLEGE

Abbreviations

cl, A. B. course; *ls*, Ph. B. course; *sc*, B. S. course; *en*, B. E. underclass course in general engineering; *se*, B. E. course in sanitary engineering; *ce*, B. E. course in civil engineering; *ee*, B. E. course in electrical engineering; N. S., North Section; M. S., Middle Section; S. S., South Section; N. C., North College; S. C., South College; O. G., "Old Gym" Dormitory.

An asterisk (*) before a student's name indicates that he has not been advanced in standing with his class.

Candidates for the Degree of Master of Arts or Master of Science

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Michael William Bray, A. B.....	<i>Churubusco</i>
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Maurice R. Brown.....	<i>Amsterdam</i>
Samuel M. Cavert, A. B.....	<i>Ballston Spa</i>
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Paul J. Hagar, A. B.....	<i>Tarrytown</i>
Edward B. Irish, A. B.....	<i>Fultonville</i>
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Roy H. McCormack, A. B.....	<i>Cincinnati</i>
Fred F. McGauley, B. S.....	<i>Schenectady</i>
Floyd Leslie Miller, Ph. B.....	<i>Schenectady</i>
Ross Williams Tiffany, B. S.....	<i>Newburgh</i>
Harry G. Van Deusen, A. B.....	<i>Sayre, Pa.</i>
Warren Chase Vosburgh, B. S.....	<i>Voorheesville</i>

Charles N. Waldron, B. S.....	<i>Schenectady</i>
Kenneth B. Walser, A. B.....	<i>New York City</i>
Roy Cameron Whitney, B. S.....	<i>Oswego</i>

Candidates for the Degree of Master of Civil Engineering

Harold W. Baker, B. E.....	<i>Oneida</i>
Tulloch McC. Townsend, B. E.....	<i>Schenectady</i>

Graduate Students in Civil Engineering

Stephen Bond Story, B. E.....	<i>Union College.....</i>	Vernon, Conn.
Candidate for the degree of Master of Civil Engineering		

Graduate Students in Electrical Engineering

Ernst F. W. Alexanderson, M. E...	<i>Royal Tech. Inst.....</i>	Sweden
Candidate for the degree of Doctor of Philosophy		
Olin J. Ferguson, M. E. E.....	<i>Univ. of Nebraska..</i>	Lincoln, Neb.
Candidate for the degree of Doctor of Philosophy		
Wilbert A. Garrison, A. M.....	<i>Harvard University..</i>	Schenectady
Candidate for the degree of Doctor of Philosophy		
Morland King, M. E. E.....	<i>Union College.....</i>	Schenectady
Candidate for the degree of Doctor of Philosophy		
Walter L. Upson, M. E. E.....	<i>Princeton University.</i>	Schenectady
Candidate for the degree of Doctor of Philosophy		
John N. Vedder, A. M.....	<i>Union College.....</i>	Schenectady
Candidate for the degree of Doctor of Philosophy		
Clarence N. Bridge, B. E.....	<i>Union College..</i>	Charlevoix, Mich.
Candidate for the degree of Master of Science in Electrical Engineering		
P'eng-Shou Chu, B. S. in E. E.....	<i>Royal Inst. Tech.....</i>	China
Candidate for the degree of Master of Science in Electrical Engineering		
Louis Du Bois De La Vergne, B. E..	<i>Union College.....</i>	Kingston
Candidate for the degree of Master of Science in Electrical Engineering		
Richard W. Evans, B. E.....	<i>Union College.</i>	Fergus Falls, Mich.
Candidate for the degree of Master of Science in Electrical Engineering		
John H. Gardener, B. E.....	<i>Union College.....</i>	Meadowdale
Candidate for the degree of Master of Science in Electrical Engineering		
Luther A. Hagar, B. E.....	<i>Union College.....</i>	Plattsburg
Candidate for the degree of Master of Science in Electrical Engineering		

- Nugihalli Narasimha Iengar, B. E....*Union College*.....India
Candidate for the degree of Master of Science in Electrical Engineering
- Harry Gard Knox, M. S.....*Mass. Inst. Tech.*..Annapolis, Md.
Candidate for the degree of Master of Science in Electrical Engineering
- Kuang Ping Koo, B. S.....*Nan Yang University*.....China
Candidate for the degree of Master of Science in Electrical Engineering
- Everett S. Lee, B. S. in E. E.....*Univ. of Illinois*.....Schenectady
Candidate for the degree of Master of Science in Electrical Engineering
- John V. Lewis, B. E.....*Union College*.....Schenectady
Candidate for the degree of Master of Science in Electrical Engineering
- Alfred Vivian Mershon.....*Pratt Institute*.....Rahway, N. J.
Not candidate for degree
- Edmond W. Moore, B. S.....*Univ. of Rochester*.....Rochester
Candidate for the degree of Master of Science in Electrical Engineering
- Walter Curtis Smith, B. E.....*Union College*....Lynchburg, Va.
Candidate for the degree of Master of Science in Electrical Engineering
- Alexander Russell Stevenson, Jr....*Princeton University*.Schenectady
Candidate for the degree of Master of Science in Electrical Engineering
- Hugh Montgomery Stoller, B. E....*Union College*.....Schenectady
Candidate for the degree of Master of Science in Electrical Engineering
- Mong Kang Ts'en, M. E.....*Cornell University*.....China
Candidate for the degree of Master of Science in Electrical Engineering
- Ting Shien Yeh, E. E.....*Lehigh University*.....China
Candidate for the degree of Master of Science in Electrical Engineering

Seniors, Class of 1915

- cl Karl Engle Agan.....*Warrensburg*.....Δ T House
- ee Raymond Barteau Arthur.....*Brooklyn*.....Δ Θ Φ Lodge
- cl Harry Floyd Bain.....*Argyle*.....Pyramid Club
- sc Walter C. Baker.....*Oneida*.....Ψ T House
- ce Wesley Hinson Baldy.....*Buffalo*.....Δ T House
- sc David John Beaver.....*Schenectady*....310 Victory Ave.
- sc Jacob Julius Beaver.....*Schenectady*....310 Victory Ave.
- sc Raymond Stewart Blodgett....*Jefferson*.....Pyramid Club
- se Ralph Emmons Boyce.....*Nassau*.....Δ Θ Φ Lodge
- *ce Charles Valentine Brewster....*Scotia*....R. F. D. No. 8, Scotia
- sc Maurice Robinson Brown.....*Amsterdam*....514 Rugby Road
- sc Carl James Byron.....*Ilion*.....Φ Δ Θ House

- *ls* Ambrose M. Clark.....*Schenectady*.....13 Front St.
sc Prescott Coyle Cleveland.....*Jamaica*.....Ψ T House
cl Donald A. Coulter.....*Schenectady*.....3 Regent St.
ce Edward Peck Culver.....*Hudson Falls*.....Ψ T House
**ee* Fred Dales Cure.....*Pine Hill*.....Δ T House
ee Harold John Delchamps.....*Mobile, Ala*.....X Ψ Lodge
ls Thomas Ashley Dent, Jr.....*Pelham Manor*.....A Δ Φ House
**cl* Robert Livingston Duane.....*New York City*.....Σ Φ Place
sc Henry Louis Faust.....*Schenectady*.....137 Clinton St.
ee William John Fisher.....*Buffalo*.....Pyramid Club
cl James Leo Fitzgerald.....*Ilion*.....M. S. S. C.
ce Samuel Henry Frankel.....*Schenectady*...234½ So. Ferry St.
**ee* Harold Duane Godfrey.....*Rosebank*.....K A Lodge
sc Myer Grosberg.....*Schenectady*...448 So. Centre St.
ee Albert Ives Hall.....*Saratoga*.....Δ Θ Φ Lodge
ce Howard Snow Hawn.....*Ravena*.....Φ Δ Θ House
**ee* Lynde De Forest Hokerk.....*Gloversville*.....Δ T House
sc Ernest Baker Houghton.....*Schenectady*.....28 Swan St.
ee Horace Newton Hubbs.....*Geneva*.....A Δ Φ House
ee Edward Richard Hughes.....*Schenectady*...25 Glenwood Blvd.
sc William Arthur Hughes.....*Schenectady*...25 Glenwood Blvd.
sc Hazen Hunter.....*Florida*.....B Θ Π House
sc Thomas Philip Keating, Jr.....*Schenectady*...322 Germania Ave.
cl Barlow Tingley Loomis.....*Unadilla*.....Pyramid Club
ls Roger William Macmillan.....*Schenectady*..145 Glenwood Blvd.
ee Cornelius Mahaney.....*Fort Plain*.....Pyramid Club
ce William Hubert Mandiville.....*Elmira*.....Ψ T House
cl Austen Geddes Martin.....*Schenectady*..165 Englewood Ave.
ee Harry Benjamin Marvin.....*New York City*.....Δ T House
ee Edwin Asa Norton.....*Derry, N. H.*.....821 Strong St.
**ee* David Benson Page, Jr.....*Oswego*.....Σ Φ Place
ee Charles Howard Purdy.....*Downsville*.....Φ Δ Θ House
ls Frank Stanley Randles.....*Argyle*.....Pyramid Club
ce John L. Scully.....*Schenectady*.....526 Liberty St.
ls Earl J. Sharp.....*Altamont*.....Φ Δ Θ House
ls Frank Leander Smith.....*Morrison, Ill*.....X Ψ Lodge
sc Stanley Maynard Smith.....*Herkimer*.....Ψ T House
ls Donald Arthur Starbuck.....*Gouverneur*.....B Θ Π House

<i>ee</i>	David George R. Stoetzel.....	<i>Schenectady</i>	407 Francis Ave.
<i>*ee</i>	Gordon O. Vosburgh.....	<i>Johnstown</i>	9 State St.
<i>sc</i>	William Winslow Wait.....	<i>Schenectady</i>	A Δ Φ House
<i>ee</i>	Gerrit Van Wagenen Wood....	<i>Buffalo</i>	Σ Φ Place
<i>ee</i>	Howard Lee Woods.....	<i>Albion</i>	Ψ Υ House

Seniors—55.

Juniors, Class of 1916

<i>sc</i>	Harlan Barrett Allen.....	<i>Lowville</i>	Δ Θ Φ Lodge
<i>ls</i>	Romeyn Treadwell Allen.....	<i>Tarrytown</i>	24 State St.
<i>ee</i>	Walter Ransom Gale Baker....	<i>Schenectady</i>	1464 State St.
<i>ee</i>	Lucius Eugene Baldauf.....	<i>Eden</i>	Pyramid Club
<i>*ee</i>	Harry Randall Ballou.....	<i>Rutland, Vt.</i>	849 Union St.
<i>sc</i>	Frank Stanton Bogaskie.....	<i>Johnstown</i>	Δ Φ House
<i>ee</i>	Albert Ralph Boomhower.....	<i>Plattsburg</i>	Ψ Υ House
<i>ls</i>	Charles Foster Brown.....	<i>Schenectady</i>	K A Lodge
<i>ce</i>	Meade Cook Brunet.....	<i>Petersburg, Va.</i>	Σ Φ Place
<i>ce</i>	James Sheldon Butler.....	<i>St. Johnsville</i>	Δ Υ House
<i>ee</i>	Antonio F. de A. Cavelcanti....	<i>Sao Paulo, Brazil</i> ..	503 Lenox Rd.
<i>ee</i>	Walter Allen Churchill.....	<i>Oswego</i>	Σ Φ Place
<i>sc</i>	William Mansfield Clinnick....	<i>Schenectady</i>	218 Lafayette St.
<i>ee</i>	Peter J. M. Clute.....	<i>Schenectady</i>	801 Strong St.
<i>ls</i>	Kenneth Creble.....	<i>Feura Bush</i>	Δ Θ Φ Lodge
<i>ee</i>	Carl Frederick Danner.....	<i>East Aurora</i>	B Θ Π House
<i>cl</i>	Mulford David De Forest.....	<i>Schenectady</i>	447 McClellan St.
<i>ce</i>	George Edward De Rouville....	<i>Albany</i>	Δ Υ House
<i>ee</i>	Harry Clifford Dikeman.....	<i>Freeport</i>	Ψ Υ House
<i>ee</i>	Lloyd Elmer Dunkelberger....	<i>Lockport</i>	Δ Θ Φ Lodge
<i>sc</i>	Revington Lyman Embree.....	<i>Stamford, Ct.</i>	Δ Υ House
<i>ee</i>	Donald Alexander Ennis.....	<i>Scotia</i> ...312 Mohawk Ave.,	Scotia
<i>ee</i>	Santiago Escalante.....	<i>Tariba, Venezuela</i> ..	20 Barrett St.
<i>ee</i>	Nathaniel Augustus Finch, Jr...	<i>Buffalo</i>	A Δ Φ House
<i>ee</i>	John Flam.....	<i>Schenectady</i>	501 Crane St.
<i>cl</i>	Lee Chase Fletcher.....	<i>Gillett, Pa.</i>	Ψ Υ House
<i>ee</i>	Walter Franck.....	<i>Schenectady</i>	831 Grant Ave.
<i>sc</i>	Harold Brooks Gardner.....	<i>Meadowdale</i>	X Ψ Lodge
<i>ee</i>	Everett Edward Garrison.....	<i>Yonkers</i>	A Δ Φ House
<i>ce</i>	Howard Allen Glenn.....	<i>Scotia</i>	221 Catherine St.

* <i>ee</i>	Clarence Elmer Glindmyer.....	Scotia.....	R. F. D. No. 8, Scotia
<i>cl</i>	William Carroll Gunning.....	Freeport.....	Ψ T House
<i>ls</i>	Kenneth Boardman Hanson.....	Albany.....	Δ Δ Φ House
* <i>sc</i>	Paul Alfred Hauenstein.....	Buffalo.....	Δ Δ Φ House
<i>ee</i>	Arnold Hooper.....	Albany.....	X Ψ Lodge
<i>ee</i>	Joseph Howard-Soler.....	New York City.....	X Ψ Lodge
<i>ce</i>	Albert Ingalls Howd.....	Schenectady.....	200 Parkwood Blvd.
<i>sc</i>	Eugene J. Hummer.....	Ravena.....	4 Lincoln St., Scotia
<i>ls</i>	John Wagner Jackson.....	Fort Plain.....	Φ Γ Δ House
<i>cl</i>	Avrom Myer Jacobs.....	Albany.....	North Colonnade
<i>ee</i>	Daniel Jerome Keleher.....	Port Chester.....	N. S. N. C.
<i>cl</i>	Milton De Forest Ketchum....	Wynantskill.....	Φ Γ Δ House
<i>ce</i>	James Taylor Landreth.....	Schenectady.....	College Hill
<i>ee</i>	Harold Miller Lewis.....	Geneva.....	M. S. S. C.
<i>sc</i>	Cornelius D. Lowell.....	Mt. Clements, Mich..	Δ Δ Φ House
<i>sc</i>	Philip Tatge Mallen.....	Chicago.....	X Ψ Lodge
<i>ce</i>	James Mauro.....	Gloversville.....	Pyramid Club
<i>ee</i>	George Glenn Mercer.....	Schuyler Lake.....	N. S. N. C.
<i>ee</i>	Ralph Merton Mixter.....	Warren.....	N. S. N. C.
<i>ee</i>	Millard Harold Moulds.....	Selkirk.....	109 Front St.
<i>ee</i>	Raymond Arthur Newton.....	Sydney.....	8 Mynderse St.
<i>sc</i>	Barron Peck Reed.....	New York City....	Pyramid Club
<i>ce</i>	Jose de Assis Ribeiro.....	Sao Paulo, Brazil....	S. S. S. C.
* <i>ls</i>	Raymond Howard Rollins.....	Round Lake.....	Pyramid Club
<i>ee</i>	Orlando Ferreira da Rosa.....	Sao Paulo, Brazil....	S. S. S. C.
<i>ee</i>	Howard Britton Santee.....	Williamson.....	Φ Δ Θ House
<i>ee</i>	Robert Thomas Scully.....	Schenectady.....	526 Liberty St.
<i>ee</i>	Carlton Newell Smith.....	Schenectady.....	332 Summit Ave.
<i>ce</i>	Jose Cuba de Souza.....	Sao Paulo, Brazil....	S. S. S. C.
<i>ee</i>	Benjamin Spraragen.....	Warwick.....	827 Albany St.
<i>ee</i>	William Spraragen.....	Warwick.....	827 Albany St.
<i>cl</i>	Milton Hijmes Sternfeld.....	Albany.....	North Colonnade
* <i>ce</i>	Glenn Ridgeway Stevens.....	Newark.....	B Θ II House
<i>sc</i>	Karl Montgomery Stoller.....	Schenectady.....	College Hill
<i>sc</i>	Leon Blanchard Streeter.....	Lake George.....	Δ Θ Φ Lodge
<i>cl</i>	James Barker Taylor.....	Greenville.....	705 Nott St.
<i>cl</i>	Richard Erastus Taylor.....	Greenville.....	705 Nott St.
<i>ee</i>	Charles Van Orden Terwilliger.	Albany.....	N. S. S. C.

<i>ee</i>	Xenophon D. Theocharides.....	<i>Marsovan, Turkey</i>	N. S. N. C.
<i>ce</i>	Leon Edward Turpit.....	<i>Elnora</i>	118 Glenwood Blvd.
<i>*ce</i>	Paul C. Van Deusen.....	<i>Cooperstown</i>	Φ Δ Θ House
<i>sc</i>	Leland Russell Van Wert.....	<i>Melrose</i>	Pyramid Club
<i>sc</i>	Schuyler Vroman.....	<i>Middleburg</i>	Δ Φ House
<i>ee</i>	Horatio Woolever.....	<i>Herkimer</i>	Pyramid Club
<i>ee</i>	Walter Ebsworth Wynne.....	<i>Albany</i>	N. S. S. C.
<i>sc</i>	Horace Zimmer.....	<i>Gloversville</i>	Δ Φ House

Juniors—76.

Sophomores, Class of 1917

<i>*en</i>	Fred Leslie Anderson.....	<i>Kellogg, Ida</i>	Pyramid Club
<i>en</i>	Henry Gustave Bahret.....	<i>Poughkeepsie</i>	Δ T House
<i>sc</i>	Kenneth Elwood Baird.....	<i>Schenectady</i>	177 Furman St.
<i>cl</i>	Allison Susholz Behr.....	<i>Amsterdam</i>	32 No. Wendell Ave.
<i>en</i>	Julio Blandy.....	<i>Sao Paulo, Brazil</i>	N. S. S. C.
<i>en</i>	Aurelio Laurinto Borelli.....	<i>Campinas, Brazil</i>	S. S. S. C.
<i>en</i>	Damaso de Souza Brandao.....	<i>Santos, Brazil</i>	N. S. S. C.
<i>en</i>	Edward Carpenter Brandow....	<i>Albany</i>	Δ T House
<i>en</i>	James Herschel Bresee.....	<i>Gloversville</i>	Pyramid Club
<i>sc</i>	Irwin Alfred Buell.....	<i>Northampton</i>	309 Germania Ave.
<i>en</i>	Clarence Jerome Bull.....	<i>Mamaroneck</i>	Ψ T House
<i>en</i>	Justin William Carr.....	<i>Astoria</i>	K A Lodge
<i>ls</i>	David Ferdinand Chapman.....	<i>Broadalbin</i>	Δ Φ House
<i>en</i>	Robert Henry Clapp.....	<i>Fairport</i>	104 Nott Terrace
<i>sc</i>	Arnold Vincent Cleary.....	<i>Easthampton, Mass.</i>	Pyramid Club
<i>en</i>	Isaac William Clements.....	<i>Fort Ann</i>	North Colonnade
<i>cl</i>	Wilson Ober Clough.....	<i>Schenectady</i>	6 Furman St.
<i>en</i>	Alva Henry Colson.....	<i>Geneseo</i>	K A Lodge
<i>en</i>	Donald Jay Coon.....	<i>Fairport</i>	104 Nott Terrace
<i>sc</i>	Thomas Joseph Corbett.....	<i>Scotia</i>	319 Mohawk Ave., Scotia
<i>en</i>	Harry Hurlburt Dibble.....	<i>Ushers</i>	North Colonnade
<i>sc</i>	Philip Windsor Downs.....	<i>Omaha, Neb</i>	X Ψ Lodge
<i>en</i>	Leslie Franklin Edgerton.....	<i>Hartsdale</i>	Σ Φ Place
<i>en</i>	Floyd Field Eldred.....	<i>Auburn</i>	Ψ T House
<i>sc</i>	Frank Russell Elmore.....	<i>Middletown</i>	B Θ Π House
<i>en</i>	Anson Ainsworth Emmerling...	<i>Albany</i>	Φ Γ Δ House
<i>en</i>	James Harold England.....	<i>Albany</i>	1125 State St., Albany

<i>en</i>	Franklin Lee Fero.....	<i>Fultonville</i>	Pyramid Club
* <i>en</i>	Lewis Milmine Fox.....	<i>Schenectady</i>	115 Irving St.
<i>ls</i>	Jacob Mitchell Frankel.....	<i>Schenectady</i> ...	234½ So. Ferry St.
<i>en</i>	Willet William Friday.....	<i>Schenectady</i> ...	25 Parkwood Blvd.
<i>en</i>	George Rae Galbraith.....	<i>Rochester</i>	Φ Γ Δ House
<i>sc</i>	Hyatt Masten Garrison.....	<i>Yonkers</i>	A Δ Φ House
<i>ls</i>	Jacob William Gauger.....	<i>Albany</i>	Δ Φ House
<i>ls</i>	William Morris Gilbert, Jr....	<i>Yonkers</i>	Ψ τ House
<i>cl</i>	Wallace Sedgwick Girling.....	<i>Jamaica</i>	Ψ τ House
<i>en</i>	Arnold Herbert Goodman.....	<i>Schenectady</i> ...	132 Parkwood Blvd.
<i>ls</i>	Arthur Clifford Kimber Hallock.	<i>Schenectady</i>	6 Gillespie St.
<i>en</i>	Mortimer Thomas Harvey....	<i>Ticonderoga</i>	Pyramid Club
<i>sc</i>	Joseph Edward Haubner.....	<i>Schenectady</i>	1031 State St.
<i>sc</i>	Albert Edward Hawn.....	<i>Albany</i>	Φ Δ Θ House
<i>sc</i>	Orra Frost Hawn.....	<i>Ravena</i>	Φ Δ Θ House
<i>en</i>	Russell Hemphill.....	<i>Westerly, R. I.</i>	Δ τ House
<i>en</i>	Charles Manser Hendry.....	<i>Rye</i>	Δ Θ Φ Lodge
<i>en</i>	Henry Walter Hochuli.....	<i>Schenectady</i>	1471 State St.
<i>cl</i>	Charles Hedrick Hummer, Jr.	<i>Ravena</i>	K A Lodge
<i>sc</i>	Earl Myron Hyatt.....	<i>Newburgh</i>	153 Barrett St.
<i>ls</i>	John Hulbert Imrie.....	<i>Lake George</i>	Δ Φ House
<i>en</i>	Merwyn James Jamieson.....	<i>Stark</i>	B Θ Π House
<i>en</i>	Anthony John Janulis.....	<i>Amsterdam</i>	N. S. N. C.
<i>sc</i>	Carl Burt Jenkins.....	<i>Glens Falls</i>	Φ Γ Δ House
<i>en</i>	Emmons Nathan Jenkins.....	<i>Griffin Corners</i> ...	708 Eastern Ave.
<i>en</i>	Elliott Vedder Jones.....	<i>Amsterdam</i>	Φ Γ Δ House
<i>en</i>	Herman Lynn Kertscher.....	<i>Elmira</i>	Ψ τ House
<i>en</i>	Earle Gidley Kniffen.....	<i>Schenectady</i>	213 Seward Pl.
<i>sc</i>	Herbert Ralph Knight.....	<i>Glens Falls</i>	Ψ τ House
<i>sc</i>	Arthur John Kooman.....	<i>Schenectady</i>	818 Lincoln Ave.
<i>sc</i>	Chaim Srolew Kuperman.....	<i>New Brighton</i>	743 Nott St.
<i>en</i>	Herbert Lasher.....	<i>Tivoli</i>	16 Wendell Ave.
<i>en</i>	Frank Alexander Laskowski....	<i>Schenectady</i>	327 Bridge St.
<i>sc</i>	Charles Tuck Lester.....	<i>Saratoga</i>	A Δ Φ House
* <i>sc</i>	Charles Albert Lewis.....	<i>Troy</i>	1 No. Church St.
<i>en</i>	Rufus Victor Maier.....	<i>Schenectady</i>	1318 State St.
<i>en</i>	Stephen Alexander Majewski...	<i>Schenectady</i>	217 Second Ave.
<i>sc</i>	Ernest Wyckoff Mandeville....	<i>Elmira</i>	Ψ τ House

sc	Louis Mann.....	New York City.....	Δ T House
en	Allen Mattison.....	South Berlin.....	Δ Θ Φ Lodge
sc	John Francis McDermott.....	Schenectady.....	129 Park Pl.
en	Ashley Clinton Mead.....	Scotia.....	22 Ballston Ave.
en	James Floyd Miller.....	Albany.....	B Θ II House
en	Humberto Monteiro da Cunha..	Sao Paulo, Brazil.....	S. S. S. C.
sc	Ralph Gleason Morison.....	Little Britain.....	Φ Δ Θ House
en	Raymond Everett Moses.....	Brackney, Pa.....	22 Barrett St.
en	George Eldred Moston.....	North Creek.....	Φ Δ Θ House
en	Armando de Souza Mursa.....	Sao Paulo, Brazil.....	S. S. S. C.
en	Gordon Clifford Nash.....	Mt. Kisco.....	111 Nott Terrace
sc	Daniel John Naylor.....	Schenectady.....	25 Washington Ave.
en	Milton McCowan Newell.....	El Paso, Texas.....	711 Nott St.
ls	Kenneth Smith Noyes.....	Lake George.....	Δ Φ House
en	Hall Brainard D. Passage.....	Schenectady.....	244 McClellan St.
en	Carl Aldon Peterson.....	Schenectady.....	220 Liberty St.
sc	Fawcett William Porter.....	Omaha, Neb.....	X Ψ Lodge
en	Don P. Price.....	Hancock.....	238 Green St.
en	Herbert Spencer Roberts.....	Scotia.....	38 Ballston Ave.
en	William Alfred Robinson.....	Van Etten.....	Pyramid Club
en	Wilfred Masten Rosekrans....	Schenectady.....	36 Wendell Ave.
ls	Albert Salisbury.....	Deposit.....	Pyramid Club
sc	Harold Leonard Sammons....	Ogdensburg.....	B Θ II House
en	Merrill Augustus Sauerbrei...	Corinth.....	Pyramid Club
en	William Schauer.....	Altoona, Pa.....	515 Chrisler Ave.
en	James McPherson Schmidt....	Hurley.....	16 Wendell Ave.
ls	Rudolph William Schwartz....	Albany.....	O. G.
en	Hal Arch Scoby.....	North Tonawanda..	B Θ II House
en	James Kyle Sexson.....	Franklin, Neb.....	Pyramid Club
ls	Francis Leatham Skau.....	Schenectady.....	19 Elm St.
sc	Homer L. Stephens.....	Gardner.....	750 Nott St.
en	Henry Gray Streeter.....	Glens Falls.....	Φ Γ Δ House
ls	David Merlin Taylor.....	Lanesboro, Pa.....	40 Glenwood Blvd.
en	Otto Christian Thuener.....	Schenectady.....	R. F. D. No. 7
ls	Ralph Sylvester Travis.....	Hale Eddy.....	Pyramid Club
ls	John Hider Tregurtha.....	Schenectady....	37 Parkwood Blvd.
en	Cecil Harley Underwood.....	Schenectady.....	202 Wright Ave.
sc	Forest Baldwin Van Avery.....	Schenectady.....	3 Haigh Ave.

<i>en</i>	Antonio dos Santos Vianna....	<i>Rio de Janeiro, Brazil.</i>	N. S. N. C.
<i>en</i>	Edward Clifton Vrooman.....	<i>Schenectady</i>	207 Union St.
<i>en</i>	Kenneth Johnson Waite.....	<i>Newburgh</i>	Φ Γ Δ House
<i>sc</i>	George Hugh Wallace.....	<i>Port Jefferson</i>	Pyramid Club
<i>en</i>	Leon J. Walrath.....	<i>St. Johnsville</i>	Δ T House
<i>en</i>	Arnold Noble Weeks.....	<i>Ticonderoga</i>	Φ Γ Δ House
<i>en</i>	Samuel Noble Wheeler, Jr.....	<i>Hancock</i>	123 Park Ave.
<i>sc</i>	Hugh Jeremiah Williams.....	<i>Elmhurst, Pa.</i>	City Y. M. C. A.
<i>en</i>	Andrew Douglas Wilson.....	<i>Schenectady</i>	313 Crane St.

Sophomores—113.

Freshmen, Class of 1918

<i>en</i>	James Nelson Aken.....	<i>Philmont</i>	Δ T House
<i>en</i>	John Lee Akins.....	<i>Lisbon</i>	B Θ Π House
<i>sc</i>	Benton Fremont Allen.....	<i>Lowville</i>	750 Nott St.
<i>pm</i>	Irwin Alpert	<i>Elmira</i>	O. G.
<i>sc</i>	Clarence O. Anderson.....	<i>Brookline, Mass.</i>	11 Barrett St.
<i>ls</i>	Lewis Mann Anker.....	<i>Albany</i>	37 Glenwood Blvd.
<i>en</i>	Le Roy Bailey.....	<i>Ballston Lake</i>	B Θ Π House
<i>ls</i>	Fredrick George Bascom.....	<i>Fort Edward</i>	K A Lodge
<i>en</i>	Rafael Macario Basilis.....	<i>Duarte, S. Domingo</i>	633 Terr. Pl.
<i>en</i>	Albert Jermain Bearup.....	<i>Albany</i>	347 Hudson Ave., Albany
<i>sc</i>	John J. Beattie.....	<i>Salem</i>	Δ Φ House
<i>sc</i>	Guy Hamilton Beckett.....	<i>Covington, Ky.</i>	X Ψ Lodge
<i>pm</i>	Harold Stephen Behlen.....	<i>Johnstown</i>	137 Elmer Ave.
<i>sc</i>	John Frederick Behnken.....	<i>Jeffersonville</i>	543 Brandywine Av.
<i>en</i>	Richard Tobin Bennison.....	<i>Frankfort</i>	141 Nott Terrace
<i>en</i>	Harold Raymond Beyerl.....	<i>Schenectady</i>	1022 Eastern Ave.
<i>en</i>	Geo. James Townsend Birdsall.....	<i>Albany</i>	Σ Φ Place
<i>en</i>	William Thomas Birdsall.....	<i>Walden</i>	Φ Δ Θ House
<i>pm</i>	Herbert Clark Blake.....	<i>Troy</i>	820 River St., Troy
<i>pm</i>	Freeman Rensselaer Boice.....	<i>Madalin</i>	16 Wendell Ave.
<i>en</i>	Charles Calvin Bowman, Jr....	<i>Pittston, Pa.</i>	A Δ Φ House
<i>en</i>	Erroll Warner Brandenstein....	<i>Schenectady</i>	603 Craig St.
<i>en</i>	Charles Seymour Brignall.....	<i>Schenectady</i>	1309 Union St.
<i>sc</i>	Almond Crandall Brockway....	<i>Richfield Springs</i>	Δ T House
<i>en</i>	John David Brown.....	<i>New Rochelle</i>	K A Lodge

<i>ls</i>	L. Prescott Brown.....	<i>Mt. Kisco.....</i>	K A Lodge
<i>pm</i>	Douglas Anderson Calhoun.....	<i>Watervliet.....</i>	325 Seward Pl.
<i>en</i>	Harry Ames Calkins.....	<i>Cohoes.....</i>	B Θ Π House
<i>cl</i>	Edward Madison Cameron, Jr.....	<i>Albany.....</i>	Δ Φ House
<i>en</i>	Willis Robert Cantrell.....	<i>New York City...</i>	14 Gillespie St.
<i>sc</i>	W. Gibson Carey, Jr.....	<i>Schenectady.....</i>	4 Ardsley Road
<i>en</i>	Warren Crosby Carter.....	<i>Malden, Mass.....</i>	24 Ray St.
<i>en</i>	Dean David Chapleau.....	<i>Ticonderoga.....</i>	Pyramid Club
<i>en</i>	Henry Anable Clarke.....	<i>Williamsport, Pa.....</i>	O. G.
<i>en</i>	Orlyn Milton Collins.....	<i>Little Falls.....</i>	Δ Τ House
<i>sc</i>	Harold James Cook.....	<i>Schenectady.....</i>	27 Division St.
<i>ls</i>	Harold Lewis Cook.....	<i>Auburn.....</i>	Ψ Τ House
<i>sc</i>	Arthur Frank Crandall.....	<i>Wappingers Falls...</i>	142 Park Pl.
<i>en</i>	Eugene George Crippen.....	<i>Schenectady.....</i>	R. F. D. No. 7
<i>pm</i>	Gilbert Henry Daring.....	<i>Albany.....</i>	15 Chestnut St.
<i>pm</i>	David Breckenridge Dawson..	<i>Cohoes.....</i>	93 Main St., Cohoes
<i>en</i>	Philip Smith Dorlon, Jr.....	<i>Troy.....</i>	O. G.
<i>sc</i>	Jarvis Geer Dowd.....	<i>East Berlin, Ct.....</i>	Δ Φ House
<i>en</i>	Albert Wynkoop Du Bois.....	<i>Athens.....</i>	Ψ Τ House
<i>sc</i>	Leon Harold Dunn.....	<i>Northville.....</i>	309 Germania Ave.
<i>pm</i>	Paul A. Dussault.....	<i>Cohoes.....</i>	904 Delamont Ave.
<i>ls</i>	Spencer Brownell Eddy.....	<i>Saratoga.....</i>	A Δ Φ House
<i>en</i>	Elmer James Ellsworth.....	<i>Schuyler Lake.....</i>	117 Front St.
<i>pm</i>	Jacob Epstein	<i>Poughkeepsie.</i>	135 V. Vranken Av.
<i>en</i>	Wendell John Erickson.....	<i>Schenectady.....</i>	7 Columbia St.
<i>en</i>	George Harold Fancher.....	<i>Schenectady.....</i>	22 Linden St.
<i>sc</i>	Robert Roy Faust.....	<i>Schenectady.....</i>	19 Jay St.
<i>en</i>	Fred William Fisch.....	<i>Utica.....</i>	9 Lafayette St.
<i>sc</i>	Porter Graham Fisher.....	<i>Buffalo.....</i>	A Δ Φ House
<i>en</i>	Leonard Harrison Frasier.....	<i>Amsterdam.....</i>	Φ Γ Δ House
<i>en</i>	Lloyd John Friday.....	<i>Schenectady...</i>	25 Parkwood Blvd.
<i>en</i>	George Laverack Frisbee.....	<i>Hamburg.....</i>	B Θ Π House
<i>en</i>	David Gardenier	<i>Chatham.....</i>	Δ Τ House
<i>pm</i>	George Otis Gilman.....	<i>Ballston.....</i>	Φ Γ Δ House
<i>en</i>	Julian Gilmour	<i>White Plains.....</i>	O. G.
<i>en</i>	Raymond Scott Glenn.....	<i>Scotia...</i>	221 Catherine St., Scotia
<i>en</i>	Alfred John Golder.....	<i>Barrytown.....</i>	205 Seward Pl.
<i>en</i>	Bruce Alexander Hainsworth...	<i>Gloversville.....</i>	North Colonnade

<i>pm</i>	Maurice Perkins Hale.....	<i>Schenectady</i>	College Hill
<i>sc</i>	Harry Emmett Hallenbeck....	<i>Fort Plain</i>	Pyramid Club
<i>en</i>	Benjamin Frank Hance.....	<i>Fairport</i>	104 Nott Terrace
<i>en</i>	Thomas Claire Hance.....	<i>Fairport</i>	104 Nott Terrace
<i>en</i>	Edward Brockway Hawley....	<i>Waterford</i>	Σ Φ Place
<i>en</i>	Harold Asahel Hawley.....	<i>Waterford</i>	Σ Φ Place
<i>en</i>	Harold Harvey Hay.....	<i>Holyoke, Mass.</i>	410 Union St.
<i>ls</i>	Clyde Alexander Heatly.....	<i>Schenectady</i>	20 Waverly Pl.
<i>pm</i>	Leland Earl Hinsie.....	<i>Schenectady</i>	32 Henry St.
<i>sc</i>	Pierre Hoag	<i>Schenectady</i>	Σ Φ Place
<i>sc</i>	Walter Hochuli	<i>Schenectady</i>	1471 State St.
<i>en</i>	Elmer Newton Howard.....	<i>E. Northfield, Mass.</i>	N. Colonnade
<i>en</i>	James Edwin Hulshizer, Jr....	<i>Bernardsville, N. J.</i>	X Ψ Lodge
<i>en</i>	Harry Forbell Hyatt.....	<i>Jamaica</i>	Ψ Υ House
<i>en</i>	Thomas Carl Isham.....	<i>Colton</i>	17 Barertt St.
<i>en</i>	Herbert Leigh Jaycox.....	<i>Beacon</i>	Φ Γ Δ House
<i>sc</i>	August John, Jr.....	<i>Schenectady</i>	113 So. Ferry St.
<i>sc</i>	Raymond Whittier Johnson....	<i>Clyde</i>	103 Nott Terrace
<i>ls</i>	Wesley Decius Karker.....	<i>Argusville</i>	23 Lafayette St.
<i>ls</i>	William Logan Kennedy, Jr....	<i>New York City</i>	Δ Υ House
<i>cl</i>	Marvin Irving King.....	<i>Schenectady</i>	237 Union St.
<i>sc</i>	Chandler Stanley Knight.....	<i>Schenectady</i>	109 Brandywine Av.
<i>en</i>	Albert Carl Komdat.....	<i>Dolgeville</i>	N. S. N. C.
<i>sc</i>	Clarence Henry Krusie.....	<i>Schenectady</i>	209 Avenue A
<i>ls</i>	Arthur Irish Ladu.....	<i>Schenectady</i>	113 Edward St.
<i>en</i>	Clarence John Ladu.....	<i>Watervliet</i>	232 Liberty St.
<i>sc</i>	Joseph Aloysius Landry.....	<i>Rouses Point</i>	135 V. Vranken Av.
<i>en</i>	Herman Lefkowitz	<i>Rochester</i>	200 Van Vranken Ave.
<i>en</i>	Ko Gyee Leong.....	<i>Rangoon, Burma, India</i>	633 Ter. P.
<i>sc</i>	Bernadotte Perrin Lester.....	<i>Saratoga</i>	A Δ Φ House
<i>en</i>	Alwyn Gordon Levy.....	<i>New York City</i>	O. G.
<i>sc</i>	Alexander Eric Lofquist.....	<i>Schenectady</i>	12 Columbia St.
<i>en</i>	Thomas Leo Madden.....	<i>Clyde</i>	70 Bedford Road
<i>sc</i>	William Mitchell Mallia.....	<i>Schenectady</i>	417 Schenectady St.
<i>en</i>	Egbert Lowe Marks.....	<i>Niskayuna</i>	Niskayuna
<i>pm</i>	Alexander Mason	<i>Gloversville</i>	115 Nott Terrace
<i>en</i>	William Herman Matern.....	<i>Gloversville</i>	North Colonnade
<i>en</i>	Harold Mattison	<i>South Berlin</i>	Δ Θ Φ Lodge

<i>sc</i>	George Michael McCarthy.....	<i>Holyoke, Mass.....</i>	29 Yates St.
<i>en</i>	John Warden McCauley, Jr.....	<i>Rochester.....</i>	Ψ T House
<i>en</i>	Ezekiel McCleary	<i>Amsterdam.....</i>	O. G.
<i>ls</i>	William McCleary	<i>Amsterdam.....</i>	Φ Γ Δ House
<i>pm</i>	William Francis McDermott.....	<i>Waterford.....</i>	Waterford
<i>pm</i>	John Grant McGill.....	<i>Cohoes.....</i>	329 Germania Ave.
<i>sc</i>	Jasper Ernest McIntyre.....	<i>Crescent.....</i>	N. S. N. C.
<i>sc</i>	Traver McKenna	<i>Albany.....</i>	Δ Θ Φ Lodge
<i>en</i>	Mark Felton McLean.....	<i>Jamaica, Vt.....</i>	North Colonnade
<i>sc</i>	James Duncan McNab.....	<i>Troy.....</i>	B Θ II House
<i>sc</i>	Charles Fay Miller.....	<i>Tribes Hill.....</i>	Pyramid Club
<i>en</i>	Harold Allen Mills.....	<i>Gloversville.....</i>	159 Barrett St.
<i>pm</i>	Camille Joseph Monette.....	<i>Rutland, Vt.....</i>	205 Sheldon Pl.
<i>pm</i>	Thomas Sylvester Mooney.....	<i>Cohoes.....</i>	411 Mumford St.
<i>en</i>	John Merton Moore.....	<i>Northville.....</i>	309 Germania Ave.
<i>en</i>	Wayne Franklin Moore.....	<i>Horseheads.....</i>	O. G.
<i>en</i>	Salvio de Camargo Moreas.....	<i>Sao Paulo, Brazil.....</i>	S. S. S. C.
<i>pm</i>	Webster Merchant Moriarta.....	<i>Saratoga.....</i>	S. S. S. C.
<i>en</i>	Mantin Edward Morris.....	<i>Schenectady...47</i>	Glenwood Blvd.
<i>sc</i>	George Franklin Mosher.....	<i>Northville.....</i>	309 Germania Ave.
<i>sc</i>	Frank D. Moynihan.....	<i>Fort Edward.....</i>	11 Barrett St.
<i>sc</i>	James Bragdon Mudge.....	<i>Schenectady.....</i>	233 Liberty St.
<i>sc</i>	Raymond F. Neuhaus.....	<i>Schenectady.....</i>	824 Lincoln Ave.
<i>en</i>	Earl Lester Newell.....	<i>East Aurora.....</i>	B Θ II House
<i>en</i>	Arthur Hempstead Newman..	<i>Bridge Hampton.....</i>	O. G.
<i>sc</i>	William Pierre Northrop.....	<i>Newburgh.....</i>	Φ Δ Θ House
<i>en</i>	James Bernard O'Brien.....	<i>Glens Falls.....</i>	149 Nott Terrace
<i>pm</i>	Myron Elijah Osterhout.....	<i>Newburgh.....</i>	Φ Γ Δ House
<i>en</i>	Theodore De Cou Palmer, Jr..	<i>Syracuse.....</i>	A Δ Φ House
<i>en</i>	James Frank Peaslee.....	<i>East Springfield...</i>	106 Park Ave.
<i>pm</i>	Alexander Wm. Pietraszewski..	<i>Schenectady...230½</i>	So. Ferry St.
<i>en</i>	Ruy Pinheiro	<i>Campinas, Brazil.....</i>	M. S. S. C.
<i>ls</i>	Mathias Philip Poersch.....	<i>Schenectady.....</i>	353 Hulett St.
<i>sc</i>	James La Vern Pollick.....	<i>Sprakers.....</i>	1303 State St.
<i>sc</i>	Edward Eldred Potter.....	<i>Plattsburg.....</i>	115 Nott Terrace
<i>en</i>	Joseph Ransdell Powell.....	<i>Lake Providence, La...</i>	Δ Φ House
<i>en</i>	Floyd Egbert Reeves.....	<i>Watertown.....</i>	Δ T House
<i>en</i>	Andrew Kidd Reid.....	<i>Schenectady.....</i>	30 Wendell Ave.

<i>sc</i>	John Raphael Riley.....	Plattsburg.....	Φ Δ Θ House
<i>en</i>	Walter Van Weet Rockwell....	Horseheads.....	O. G.
<i>en</i>	Arthur Spencer Rodgers.....	Troy.....	205 Seward Pl.
<i>sc</i>	Dow Geesler Roof.....	Canastota.....	Φ Γ Δ House
<i>en</i>	Harold Percival Rounds.....	Dexter.....	831 Eastern Ave
<i>sc</i>	Walter Andrew Rowley.....	Albion.....	O. G.
<i>en</i>	Theotonio Sa, Jr.....	Rio de Janeiro, Brazil..	M. S. S. C.
<i>en</i>	Edwin Augustus Schabbehar....	Rockville Center.....	O. G.
<i>sc</i>	Roy Augustus Schuyler.....	Pattersonville.....	Φ Γ Δ House
<i>sc</i>	Hyman W. Sevits.....	Glens Falls.....	139 Lafayette St.
<i>en</i>	Vernon Villeroy Shattuck.....	Schenectady.....	R. F. D. No. 1
<i>sc</i>	Robert Winfield Sherwood.....	Sidney.....	8 Mynderse St.
<i>en</i>	Samuel Ewart Simms.....	Dobbs Ferry.....	O. G.
<i>en</i>	Ernest Randolph Slade.....	Gloversville.....	North Colonnade
<i>ls</i>	Leo Henry Smith.....	Warrensburg.....	20 Barrett St.
<i>en</i>	Robert Smith, Jr.....	Schenectady....	508 Campbell Ave.
<i>en</i>	Louie Spraragen	Warwick.....	827 Albany St.
<i>pm</i>	Edson Hun Steele.....	Mongaup Valley.....	134 V. Vranken A.
<i>cl</i>	Ignatz Russell Stein.....	Schenectady....	133 V. Vranken A.
<i>sc</i>	John Barnaby Still.....	Mayfield.....	201 Green St.
<i>en</i>	Kenneth William Stillman....	Argyle.....	Pyramid Club
<i>en</i>	Julian Reed Strother.....	Edgefield, S. C.....	Σ Φ Place
<i>en</i>	Fred Leland Kasson Swart....	Auburn.....	1007 Nott St.
<i>sc</i>	Winfield Quenten Swart.....	Schenectady.....	200 Edward St.
<i>sc</i>	Arthur Charles Swartz.....	Albany.....	North Colonnade
<i>sc</i>	Sidney Wells Talbot.....	Schenectady.....	1562 State St.
<i>sc</i>	John Arthur Taylor.....	Schenectady.....	138 Van Vranken Av.
<i>en</i>	Carl John Tell.....	Milwaukee, Wis.....	Σ Φ Place
<i>pm</i>	Glenn Almy Thomas.....	Bellefonte, Pa....	Φ Δ Θ House
<i>pm</i>	John Francis Timpane.....	Troy.....	2314 Sixth Ave., Troy
<i>en</i>	Frank Klementis Toth.....	Unionville, Ct....	633 Terrace Pl.
<i>sc</i>	Hunter Adaline Towne.....	Duluth, Minn.....	Δ Φ House
<i>en</i>	Leslie Samuel Uphoff.....	Schenectady.....	120 Avenue B
<i>ls</i>	Beverly Leland Vosburgh.....	Johnstown.....	9 State St.
<i>pm</i>	Edward Joseph Walsh.....	Schenectady.....	1302 State St.
<i>pm</i>	Duncan Campbell Ward, Jr....	Schenectady.....	1422 State St.
<i>en</i>	Daniel Fernando Waugh.....	Theresa.....	Σ Φ Place
<i>pm</i>	Harry Weaver	Amsterdam...13	Jackson St., Am.

<i>ls</i> James Joseph Welch, Jr.....	<i>Saratoga</i>	Δ Φ House
<i>en</i> Ralph Clark Williams.....	<i>Hudson Falls</i>	9 Lafayette St.
<i>sc</i> Rudolph Wirth	<i>Schenectady</i>	135 Nott Terrace
<i>en</i> Victor Ainslie Wynne.....	<i>Albany</i>	N. S. S. C.
<i>sc</i> Edwin Willard Yordon.....	<i>Fort Plain</i>	X Ψ Lodge
<i>cl</i> John Charles Younie.....	<i>Schenectady</i>	26 Nott Terrace
<i>en</i> Andrew Anthony Ziegler.....	<i>Coeymans</i>	6 Mynderse St.
<i>en</i> Max Zuckerman	<i>Gloversville</i>	115 Nott Terrace
Freshmen—185.		

Summary of Students, Union College

Candidates for the Master's Degree.....	22
Graduate Students	25
Seniors	55
Juniors	76
Sophomores	112
Freshmen	185
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	475
Counted twice	1
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Total	474
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STUDENTS OF THE ALBANY MEDICAL COLLEGE

Fourth Year Class

Julius Robely Almer.....	New York City
Percy Huntley Austin.....	Warrensburgh
Walter Schneider Bennett.....	Hartford
John Edward Burke.....	Schenectady
Hugh Smith Chedister.....	Saugerties
Albert Nelson Ciouch.....	Troy
Samuel Colliss	Brooklyn
Arthur Hiram Congdon.....	Fort Plain
Stephen Horace Curtis.....	Troy
Gerald Edward Dailey.....	Gloversville
Frank Edward Dean, Jr.....	South Shaftsbury, Vt.
Irwin Van Olinda Decker.....	Troy
Arthur Maultby Dickinson.....	Albany
Francis Thomas Duffey.....	Troy
James Manning Dunn.....	Schenectady
Laurence Joseph Early.....	Schenectady
Frederick George Eaton.....	Saratoga Springs
Guy Fish.....	Indian Lake
John Joseph Gurion.....	Albany
Leon Willis Green.....	East Springfield
William Lester Grogan.....	Rome
Ralph Marsh Hall.....	Albany
Raoul Albert Herbert.....	Cohoes
John Edward Heslin.....	Saratoga Springs
Stanley Norton King.....	Urlton
James Larsfield Lyons.....	Albany
William Barnard McKeon.....	Troy
Joseph William Miller.....	New York City
Martin Alvin Murphy.....	Hoosick Falls
William Francis Nealon.....	Hoosick Falls
Vincent John Thomas Neill.....	Highland Falls
Charles Trueman Nichols.....	Philmont
Johnathen Pearson, B. S.....	Schenectady
Theodore Dorris Reed.....	Albany
Homer Isaac Rexford.....	Waterford

George Styles Reiter.....	Stepney Depot, Ct.
Arthur Grant Rodgers, Jr.....	Rensselaer
William Joseph Ryan.....	Newport
Frank Phillip Schneider.....	Utica
Ernest Raymond Schilling.....	East Chatham
Benjamin Herman Shapiro.....	Glens Falls
Robert Cunningham Simpson, Jr.....	Boston, Mass.
Byron Gray Schultz.....	Johnstown
William Patrick Sweeney.....	Saratoga Springs
Charles William K. Tomlinson.....	Troy
Leonard Kypp Van Dyck, A. B.....	Philmont
William Bernice D. Van Auken.....	Voorheesville
Fred Vosburgh	Cobleskill
Herbert Austin Vogel.....	Albany
Archibald Albert Walker.....	Callicoon
Bernath Weiss	Brooklyn
Joseph Wrana	Brooklyn
Fourth Year Class—52.	

Third Year Class

James McTaters Archbold.....	Cohoes
Harold Arthur Bancroft.....	Schenectady
Morgan Otto Barrett.....	Albany
Edward Oscar Boller.....	Elizabeth
William Charles Bruns.....	Jamaica
William James Carroll.....	Sag Harbor
John Dennis Carroll.....	Troy
Lawrence Henry Cutter.....	Poughkeepsie
Loyal Lindsey Dunlap.....	Stony Creek
Richard Patrick Doody.....	Cohoes
Henry Edward Elwood.....	Corning
James Walter Fitzgerald.....	Troy
Michael Angelo Ganginn.....	New York City
Carl Gephard.....	Mount Vernon
Daniel Frost Glenn.....	Van Homesville
William Goldbrush	Brooklyn
Victor Giancontieri	Brooklyn
John Lawrence Hemstead, Ph. G.....	Waterford

Hyman Herschberg	Albany
Frederick William Holcomb.....	Palenville
Howard Conkling Johnston.....	Horicon
Howard Marion Kenyon.....	Albany
John Christian Knapp.....	Philmont
Charles Augustus Krauss.....	Watervliet
Francis James Lawlor.....	Pulaski
Edward Leo McDermott, B. S.....	Schenectady
Frank Buckley McGuire.....	Albany
John Williams McKeever.....	Newburgh
Walter McShane.....	Springfield Center
Royal Harrison Mayhew.....	Whitesboro
Burton Carr Miller, B. S.....	Albany
James Madison Neary.....	Watervliet
Matthew Francis Oldstein.....	Peekskill
Edward Bernard O'Keefe.....	Hadley
Robert Morris Palmer, A. B.....	Gloversville
Arla James Park.....	Hudson Falls
Harold Artemus Peck.....	Albany
Ray Eugene Persons.....	Jewett
Abraham Max Rabiner.....	Albany
George Mark Richards.....	Corning
Clarence Fay Rinkle.....	Boonsville
Lester Edwin Sanford.....	Albany
Leslie Boyd Seaport.....	Cohoes
Howard Barton Swan.....	Chestertown
Harry Knibb Tebbutt.....	Albany
Ben Tichenor.....	New York City
Wesley Alter Van Deusen.....	St. Johnsville
Howard A. Van Keuren.....	North White Lake
Earl Charles Waterbury.....	Campbell Hall
Theodore Stephen West.....	New York City
Aaron Weinberg.....	New York City
Rayburn James Wharton.....	Summitt, N. H.

Third Year Class—52.

Second Year Class

Stanley Earl Alderson.....	Little Falls
Milton Aronowitz, B. S.....	Albany

David Samuel Babtckiss.....	New York City
Clarence Walter Barth.....	Schaghticoke
Raymond Germand Bell.....	Auburn
James Michael Bernhardt.....	Schenectady
Sidney William Bisgrove, B. S.....	Schenectady
Anathol Michael Breault.....	Cohoes
Thomas McGrath Brennock.....	Albany
Leroy Joseph Butler.....	Waterford
Herbert Francis Carroll.....	Indian Lake
Byron Edwin Chapman.....	Broadalbin
Harold F. Cleveland, Ph. G.....	Salem
Max Cooper	Brooklyn
Norman Scott Cooper.....	Athens
Leon Charles Cote.....	Lake George
Howard Wilcox Davis.....	Schenectady
Edward Thomas Delehanty.....	Albany
Lewis Joseph DeRusso.....	Albany
William Edward Gazeley.....	Albany
Charles Williard Green.....	Schenectady
Samuel William Green.....	Brooklyn
Isaac Goldstein.....	New York City
Joseph Taylor Griffin.....	Schenectady
Daniel Francis Hanion.....	Pittsfield, Mass.
Harold Calvin Haviland.....	Hudson Falls
Kent Wood Jarvis.....	Delanson
Clement James Jasoloski.....	Schenectady
Raymond Francis Kercher.....	Albany
Maximillian Kohlenberg, Jr.....	Brooklyn
Robert A. MacTaggart.....	Schenectady
Charles Nester.....	New York City
William Panitch.....	Central Nassau
George Trecise Polk, Jr.....	Poughkeepsie
Donald Dean Prentiss.....	Pittsfield, Mass.
Samuel Posner	Brooklyn
John Joseph Randall.....	Albany
Jacob Reswick.....	New York City
John Harry Robbins, Ph. G.....	Rensselaer
John Hourne Robertson.....	South Glens Falls

Avery Hugo Sarno.....	Amsterdam
Nathan Sesitzley.....	New York City
Edward Grady Sheehan.....	Watervliet
Norman Leo Sheehe.....	Dunkirk
Ivan Michael Schneible.....	Albany
George Milo Thomas.....	Adams Center
Ralph Waldo Turner.....	Troy
Chester Bruce Van Gasbeek.....	Kingston
Irving Van Woert.....	Albany
George Clark Vogt.....	Kingston
Charles Francis Walsh.....	Watervliet
Frank Williams Alroy Whele.....	Rochester
Earl Wayne Wilkins.....	West Albany
Burchard Alfred Winne.....	Hancock
Second Year Class—54.	

First Year Class

Kenneth Greene Armstrong.....	Utica
Charles Pahl Archambault.....	Brooklyn
Edward Buckley Campbell, A. B.....	Cohoes
Mark Joseph Daly.....	Dunkirk
Charles James Higley.....	North Adams, Mass.
Patrick Henry Huntingdon.....	Mechanicville
Milton James Jacobson.....	Troy
Gerald Reed Jamieson.....	Albany
Victor Joseph Mallett.....	Troy
Anthony Pendola.....	Brooklyn
Barney Weeks Phillips.....	Altamont
Gerald Herbert Porter.....	Wilmington, Vt.
George Edward Smith.....	Troy
First Year Class—13.	

Summary of Students, Albany Medical College

Fourth Year Students.....	52
Third Year Students.....	52
Second Year Students.....	54
First Year Students.....	13
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Total.....	171
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STUDENTS OF THE ALBANY LAW SCHOOL

Third Year Class

E. Lopez Acosta.....	San German, P. R.
E. Lee Allen.....	Richfield Springs
Francis E. Burns.....	Catskill
Leo W. Begley.....	Schenectady
John P. Booth (Yale).....	Plattsburg
F. Walter Bliss (Cornell).....	Middleburg
Stephen W. Brennan.....	Clinton
L. E. Clickner (Cornell).....	Troy
Sydney B. Cooper.....	Watertown
Joseph P. Coyle.....	Wellsville
Ambrose V. Cuning.....	Troy
William H. De Kay, Jr.....	Hurleyville
Francesco De Lellis (Pittsburg).....	Campobasso, Italy
Irma D. Ellis.....	Albany
Edwin C. Fellows.....	Newport
Maurice E. Freedman.....	Albany
Holland R. Foster.....	Owego
James H. Gould (Union).....	Schenectady
Patrick S. Guinnane.....	Jamestown
Charles T. Hurley.....	Seneca Falls
James E. Kelly.....	Troy
John M. Knapp.....	Hurleyville
Judson S. Landon (Yale).....	Schenectady
Alexander H. Leamon (Union).....	Schenectady
Myer J. Lavin.....	Albany
John J. McDevitt.....	Quincy, Mass.
Arthur D. Mann (Union).....	Schenectady
Allan B. Mann (Union).....	Schenectady
Carroll E. Mealey.....	Valatie
Donald Lawrence MacLean.....	Cohoes
James E. O'Kane.....	Rochester
Joseph P. O'Connell.....	Binghamton
Byron H. Proper.....	Cobleskill
Roy Webber Peters (Union).....	Schenectady
Tobias E. Purcell.....	Corning

Ogden J. Ross.....	Troy
Jacob S. Raisin (Cincinnati).....	Troy
Roy R. Richards.....	Plattsburg
George J. Skivington.....	Mumford
Eugenio Vera.....	Mayaguez, P. R.
Earl J. Wiley (Cornell).....	Troy
Willard A. White.....	Glens Falls
John C. F. Welsh.....	Catskill
Leslie G. Wiggins.....	Rome
Third Year Class—44.	

Second Year Class

George A. Brown.....	Clyde
James A. Bray.....	Cherubusco
Burns F. Barford (Fordham).....	Valatie
Fletcher A. Blanchard.....	Albany
James A. Ball.....	Watervliet
Lilian Brockow	Albany
William Bentley	Albany
C. Raymond Burton.....	Brookview
Rudolph J. Blais.....	Cohoes
Edward Coyle.....	Glens Falls
George H. Cronin.....	Albany
Edward A. Corcoran.....	Mechanicville
John J. Conners.....	Albany
Bernard J. Carney.....	Ballston
Henry A. Cohen.....	Albany
James Doyle	Amsterdam
Arthur C. Downing.....	Mechanicville
Leo M. Doody.....	Albany
H. P. Dawson.....	Toronto, Ont.
Earl Leslie Dey.....	Freeville
James B. Dempsey (Cath. Univ. of Am.).....	Albany
H. V. Delaney.....	Albany
John D. Dickson.....	Angelica
Roscoe V. Elsworth.....	Port Ewen
Palmer W. Everts.....	Granville
Rocco M. Fischette.....	Clyde

Daniel F. Fitzgerald.....	Rochester
Byron S. Fox.....	Rome
Horatio Gates Glen, Jr. (Amherst).....	Schenectady
W. E. Goodrich.....	North Troy
Frederick H. Harris (Union).....	Peekskill
George B. Hurley.....	Warrensburg
John J. Hyland.....	Penn Yan
Henry R. Herman.....	Newburgh
James Hayden	Troy
John G. Hines.....	Albany
J. Howard Hahn (Hamilton).....	Albany
L. Victor Harrison.....	Johnstown
Cornelius R. Johnson.....	Troy
Maurice Merton Katz.....	Schenectady
John W. Kennedy.....	Troy
Ambrose J. Kelly.....	Mechanicville
Paul Knox	Troy
Edgar S. Knox.....	Albany
Harlan Kenyon	Troy
John W. McConnell (Middlebury).....	Valatie
Archibald R. MacKennan.....	Poughkeepsie
Fay B. Moore.....	New York City
Henry Bacon Merritt.....	Goshen
John S. McGrath.....	Watervliet
William M. Nicoll.....	Scotia
George M. Osgoodby.....	Baltimore, Md.
James A. O'Connor.....	Waterford
Timothy O'Connor.....	Boston, Mass.
William H. O'Neil.....	Albany
William F. Pritchard.....	Albany
Raymond Quinones.....	Mayaguez, P. R.
Edward F. Ryan.....	Monticello
William Riseley	Kingston
E. H. Simonds.....	Carthage
R. L. Smith.....	Monticello
Forest E. Stack.....	North Creek
Alfred H. Stamper.....	Albany
Sherwood B. Speed (Colgate).....	Hudson

Charles A. Sibbald (R. P. I.).....	Troy
Henry J. Semo.....	Rome
Howard E. Taylor.....	Binghamton
Frederick R. Twelvetrees (Princeton).....	Cohoes
Ernest F. Tripp.....	Schenectady
Aurelius M. Tracey, Jr. (Rutgers).....	Hudson
Edward F. N. Uthe.....	Coeymans
Hendrick W. Van Ness (Middlebury).....	Greenwich
James J. Walsh (New York Law School).....	Albany
Harold Gibson Wentworth.....	Albany
J. Emmett Wall.....	Albany
Cornelius J. Wood, Jr.....	Chatham
Frank L. Wiswall.....	Watervliet
Arthur C. Ward.....	Schenectady

Second Year Class—78.

First Year Class

Leland W. Adams.....	Watertown
Charles Pattson Andrews.....	Saratoga Springs
C. Watson Arthur.....	Troy
John K. Austin.....	Schenectady
Albert H. Bacon (State Teachers).....	Rensselaer
David Belkin (Cornell).....	Albany
Arthur A. Beaudry.....	Cohoes
C. K. Butler (Dartmouth).....	Saratoga Springs
Chatfield T. Bates (Union).....	Schenectady
Edgar D. Cantwell.....	Albany
Earle G. Clarke.....	Mechanicville
Charles C. Coleman.....	Goshen
Irving J. Chamberlain.....	Cohoes
F. Raymond Chant.....	Johnstown
William F. Darby.....	North Troy
Cecilia F. Doran.....	Troy
Marion E. Dunham.....	Saratoga Spa
Anna Grace Dolan.....	Albany
Edgar F. Downs.....	Plattsburg
William Deckelman	Obernburg

John J. Delaney.....	Troy
Frank E. Devans.....	Rochester
Rodney Ray Ellis (Vermont).....	Poultney, Vt.
Joseph Epsteen.....	Providence, R. I.
Kenneth H. Fake.....	Cobleskill
George B. Fish.....	Rutland, Vt.
Walter Maurice Flynn.....	Westerly, R. I.
E. Ralph Gosier.....	Rosiere
E. Francis Holland.....	Schenectady
Frederick G. Hazard.....	Utica
Thomas Palmer Huxtable.....	Troy
J. Irwin Holton.....	Waterford
John A. Kosinski (Union).....	Amsterdam
John J. Kelly.....	Troy
J. B. Kelly.....	Saratoga
Abraham Meyer Levinson.....	Albany
W. Mace Laraway.....	Oak Hill
Louis Lieberman	Rensselaer
Joseph T. McEntee.....	Albany
James A. McCarthy.....	Troy
James J. Macksey.....	Norwich
Joseph M. Mesnig (R. P. I.).....	Troy
Carleton Marvin.....	Hoosick Falls
Amos De Lany Moscrip.....	Albany
Nathan Medwin	Albany
James M. Noonan.....	Mechanicville
Robert W. Owens, Jr. (Marietta).....	Poultney, Vt.
Chas. O'Donnell	Poughkeepsie
Francis Hugh O'Neill.....	Schenectady
Thomas F. O'Neil.....	Albany
Albert J. Ornsteen, Jr.....	Poughkeepsie
Katherine A. Paddock.....	Malone
Helen B. Page.....	Albany
Andrew A. Padula.....	Albany
Frederick S. Quinterro.....	Poughkeepsie
Harry J. Rekemeyer.....	Johnstown
Julius Lewis Reich.....	Albany
Edward William Reich.....	Albany

Herbert J. Rambert.....	Webster
Edward L. Ryan.....	Troy
Kenneth W. Rice.....	Albany
E. Howard Ringrose.....	Westernville
Eugene J. Sheehan.....	Albany
Howard Sexton	Utica
Joseph Edward Spain.....	Troy
John M. Schneider.....	Albany
Benjamin Saperstein	Troy
Lawrence Stage	Warwick
Meyer H. Slack.....	Haverstraw
G. Gordon Steele.....	Albion
Warren B. A. Scanlon.....	Cohoes
Monroe Schlesinger	Kingston
Clifford Tennis.....	East Randolph
Hugh K. Tobias.....	Albany
Harold W. Ward.....	Gloversville
Walter J. Ward.....	Albany
John William Welch.....	Coxsackie
Robert H. Wright.....	Rensselaer
Coplon Yaras	Albany
First Year Class—79.	

Summary of Students, Albany Law School

Third Year Students.....	44
Second Year Students.....	78
First Year Students.....	79
<hr/>	
Total.....	201
<hr/>	

STUDENTS OF THE ALBANY COLLEGE OF PHARMACY

Second Year Class

Jack Walter Abraham.....	Rutland, Vt.
Charles Leo Archambault.....	Plattsburg
Earl Clark Baker.....	Potsdam
William Levi Barker.....	Elizabethtown
Matilda Meta Bongartz.....	Kingston
William James Brislin.....	Fort Edward
Harold Raymond Bronk.....	New Baltimore
Joseph Harold Brown.....	Albany
Charles Henry Burnett.....	Red Hook
Francis Bernard Casey.....	Proctor, Vt.
William Ernest Dyroff.....	Highland Falls
Norman James Francis.....	Troy
Roland Ray Fuhrer.....	Roscoe
Marion Monica Gray.....	Rensselaer
Robert Ulysses Green.....	Sidney
H. Gray Haskins.....	Granville
Francis Aloysius Healey.....	Troy
Daisey May Howard.....	Windham
William Dean Hyde.....	Waverly
Walter Kinnin	Greenwich
Joseph Michael Kulakowski.....	Albany
Thomas Frederick LeGrys.....	Cambridge
William Joseph Manion.....	Waterford
Edward L. Marriott.....	Rome
Harry Sawyer Metcalf.....	Elizabethtown
Darwin Elmer Mott.....	Cobleskill
George Van Nellis.....	Fonda
George Gabriel O'Connell.....	Moir
Edward O'Neill	Albany
Frank B. O'Neill.....	Troy
John Howard Palmer.....	Marlboro
Floyd Jeremiah Reagan.....	Norfolk
Charles Laurence Rozon.....	Momi
Florence Anna Ryan.....	Newport
Walter Leo Ryan.....	Rensselaer

Elmer John Schiemer.....	St. Johnsville
Harold Joseph Smith.....	Warwick
Kenneth Wade Swain.....	North Creek
John Joseph Troy.....	West Stockbridge, Mass.
Louis Napoleon Turner.....	Keeseville
Andrew Ulrichs	Greene
Harry Jacob Van Vleck.....	Hudson
John Buckley Vernooy.....	Albany
Roland Otto Vogel.....	Schenectady
Roy Scofield Wallace.....	Norwich
Albert Dudley Warner.....	Albany
Lloyd Beardsley Whitaker.....	Hudson
John William Wieser.....	Albany
Brooks Frank Wood.....	Salisbury, Vt.
Alexander Deiches	Albany

Second Year Class—50.

First Year Class

Earle Dean Armstrong.....	Athens
Edgar Deussenberry Barrett.....	Windsor
Nerses Ler Boghesseau.....	Aintab, Turkey
Roy Boles	Wevertown
George Edward Bonner.....	Luzerne
James Henry Bonner, Jr.....	Luzerne
William Pitt Briggs, Jr.....	Albany
Horace Mitchell Carter.....	Salisbury, Vt.
Joseph Thomas Cavanaugh.....	Albany
Frederick Harold Clark.....	Mechanicville
Clifford Palton Collins.....	Troy
Francis DeSales Conroy.....	Norwich
Thomas Valentine Conway.....	Canajoharie
James Henry Cunningham.....	Warrensburgh
Charles Alton Edwards.....	Albany
Jacob Epstein	Albany
Lester Robert Finklestein.....	Albany
Peter John Fuhrman.....	Troy
William Aloisius Gearn.....	Troy

Lorette Elizabeth Graney.....	Hoosick Falls
Sarah Ethel Graney.....	Hoosick Falls
Frank Graziadei	Albany
Marguerite Rebecca Griffin.....	Troy
Herschell James Hess.....	Boomville
Stewart Henry Himes.....	Troy
Meryll Cornelius Hoagland.....	Cobleskill
Edson Parker Howes.....	Albany
Stewart Hudson.....	Rouses Point
Edward George Heusted.....	South Cairo
Rockwell Andrew Hurlburt.....	Harpersville
Charlie Roscoe Hutchins, Jr.....	Norwich
Teresa Conway Ingraham.....	Troy
Chester Kinnever Jones.....	Canajoharie
Patrick Edward Kiley.....	Schuylerville
John Wilson King.....	Rensselaer
Arthur Ernest Knapp.....	Palmer
Jöseph Elroy DeLafayette.....	Ballston Spa
Edward Francis Leahy.....	Ballston Spa
Ralph Matthews Lord.....	Tannersville
George Dewey Luff.....	Johnstown
Ernest Nelson Mason.....	Rupert, Vt.
Owen Francis McMahon.....	Norwich Center
Ralph Churchill Moody.....	St. Regis Falls
Raymond Williard Menger.....	Dolgeville
Paul Stanley Murphy.....	Auburn
Harold David Newton.....	Gloversville
Elizabeth Johanne Noonan.....	Schenevus
Ralph Thompson Pollock.....	Argyle
Raymond Colwell Quinlan.....	Bennington, Vt.
Elmer Crosters Ross.....	Albany
Mattis Schaffer	Schenectady
Benjamin Harrison Schwadelson.....	Albany
Marion David Scott.....	Walton
Anna Silberg	Albany
George Joseph Smith.....	Ellenville
John Vernon Smith.....	Chatham
Fred Larkin Stilson.....	Cobleskill

Raymond Henry Stoetzel.....	Schenectady
Ruth Skillman Lafft.....	Watervliet
Jay Rossman Tiffany.....	Hudson
Raymond Cornelius Van Vliet.....	Hudson
Charles Edwin Vedder.....	Schenectady
Forrest E. Wagoner.....	Tannersville
Paul Henry Warburton.....	Albany
Norman Edwards Waters.....	Rensselaer
Alvin Johnson White.....	Eaton
Lester Elmer Whitford.....	Fort Edward
First Year Class—67.	

Summary of Students, Albany College of Pharmacy

Second Year Students.....	50
First Year Students.....	67
Total.....	117

SUMMARY OF STUDENTS, UNION UNIVERSITY

Union College	474
Albany Medical College.....	171
Albany Law School.....	201
Albany College of Pharmacy.....	117
Total	963

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OF
UNION UNIVERSITY



1915-1916

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UNION UNIVERSITY

Union University embraces the following institutions:
UNION COLLEGE, Founded 1795

Academic Department	{	Classical Course
		Latin Scientific Course
		Scientific Course
		Pre-medical Course

Engineering Department	{	General Engineering Course
(Established 1845)		Electrical Engineering Course

ALBANY MEDICAL COLLEGE, Founded 1838

ALBANY LAW SCHOOL, Founded 1851

DUDLEY OBSERVATORY, Founded 1852

ALBANY COLLEGE OF PHARMACY, Founded 1881

Union College acquired by its charter, granted in 1795, full university powers, but the creation of graduate institutions at Schenectady was not then found practicable. Schools of law and medicine and also an astronomical observatory have long existed at Albany, only a few miles distant. The arrangement naturally suggested by these circumstances was, that the professional schools and the observatory at Albany should be united with Union College, under the charter and board of trustees of the latter. This was accordingly effected by the incorporation of Union University in 1873. The Albany College of Pharmacy was created by the board of governors on June 21, 1881, and incorporated as a department of the university on August 21 of the same year.

The president of Union College and permanent chancellor of Union University has the oversight of the university, each of the institutions having its resident dean. The dean of Union College acts in the place of the president in the latter's absence and also has charge of matters delegated to him by the president. The university board of governors is composed of permanent trustees of Union College and of representatives of each of the other institutions embraced in Union University.

1915 — UNIVERSITY CALENDAR — 1916

1915

First semester of Union College begins..Monday, September 20
 First semester of Law School begins....Tuesday, September 21
 First semester Medical College begins...Monday, September 27
 First semester College of Pharmacy....Tuesday, September 21
 Election day — recessTuesday, November 2
 Thanksgiving day — recess.....Thursday, November 25
 Christmas recess in all departments....Thursday, December 23

1916

Sessions resumed.....Tuesday, January 4
 Day of prayer for colleges.....Thursday, January 20
 First semester of Law School ends.....Friday, January 28
 Second semester of Law School begins....Tuesday, February 1
 First semester Medical College ends.....Saturday, January 29
 Second semester Medical College begins....Tuesday, February 1
 First semester Union College ends.....Saturday, February 5
 Second semester Union College begins....Monday, February 7
 Washington's birthday — recess.....Tuesday, February 22
 Easter recess.....Friday-Monday, April 21-24
 Commencement, College of Pharmacy.....Tuesday, April 5
 Commencement, Medical College.....Thursday, June 8
 Memorial day — recess.....Tuesday, May 30
 Commencement, Law School.....Thursday, June 8
 Commencement week, Union College,

Sunday-Wednesday, June 11-14

Entrance examinations, Union College,

Thursday-Friday, June 15-16

First semester Union College begins....Monday, September 18
 First semester of Law School begins..Wednesday, September 20
 First semester Medical College begins....Monday, September 25
 First semester College of Pharmacy....Monday, September 26
 Election day — recess.....Tuesday, November 7
 Thanksgiving day — recess.....Thursday, November 30
 Christmas recess in all departments.....Friday, December 22

For calendars of departments, see Pages 20, 155, 169, 174.

OFFICERS OF THE UNIVERSITY

Chancellor

CHARLES ALEXANDER RICHMOND, D. D., LL. D.

Honorary Chancellor, 1915

HENRY CABOT LODGE, LL. D.

Board of Governors

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Vice-President, AMASA J. PARKER, LL. D.

Secretary, J. NEWTON FIERO, LL. D., Albany

Union College

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GEORGE ALEXANDER, D. D.....	New York City
WARNER MILLER, LL. D.....	Herkimer
NICHOLAS V. V. FRANCHOT, A. M.....	Olean
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FRANKLIN H. GIDDINGS, LL. D.....	New York City
COURTLAND V. ANABLE.....	New York City

Albany Medical College

SIMON W. ROSENDALE, LL. D.....	Albany
ALDEN CHESTER.....	Albany

Albany Law School

AMASA J. PARKER, LL. D.....	Albany
J. NEWTON FIERO, LL. D.....	Albany

Dudley Observatory

WILLIAM H. SAGE.....	Albany
BENJAMIN WALWORTH ARNOLD.....	Albany

Albany College of Pharmacy

WILLIS G. TUCKER, M. D., PH. D.....	Albany
CHARLES NEWMAN.....	Albany

UNIVERSITY FACULTY

CHARLES ALEXANDER RICHMOND, D. D., LL. D.
Chancellor

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Dean of Union College and Professor of History and Government

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Dean of the Law School and Lecturer on the Law of Procedure,
Equity, Evidence, Current Law, Trusts and Trustees,
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Professor Emeritus of Ophthalmology and Otology

GUSTAVUS MICHAELIS, PH. G,
Professor Emeritus of Pharmacy

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Secretary of the College of Pharmacy and Professor of Botany
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Ichabod Spencer Professor of Philosophy

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Professor of the Law of Bailments, Bills and Notes, Guarantee
and Suretyship, Constitutional Law and Municipal Corporations

FLETCHER W. BATTERSHALL

Professor of the Law of Persons and Property, Domestic Rela-
tions, and Partnership

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Professor of Electro-Physics

JOHN I. BENNETT, A. B.

Professor of the Greek Language and Literature

HOWARD OPDYKE, A. B.

Professor of Physics

EDWARD ELLERY, A. M., PH. D., SC. D.

Professor of Chemistry

FRANK WHITE, M. A.

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GEORGE LAWYER

Professor of the Law of Contracts, Personal Property and Sales,
Bankruptcy, and Damages

FRANK B. GILBERT

Professor of the Law of Real Property and of Statutes and
Statutory Construction

FRANK C. BARNES, A. M., PH. D.

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HORACE G. MCKEAN, A. M.

Professor of Rhetoric and Public Speaking

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Professor of Mathematics

GEORGE D. KELLOGG, PH. D.

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JOHN A. SAMPSON, M. D.

Professor of Gynecology

FREDERICK W. CAMERON, M. A.

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CHARLES J. HERRICK

Professor of Civil Law, International Law, and Conflict of Laws

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LA SALLE ARCHAMBAULT, M. D.

Professor of Neurology

HERMAN C. GORDINIER, A. M., M. D.

Professor of Medicine

ARTHUR W. ELTING, M. D.

Professor of Surgery

WESLEY M. BALDWIN, A. M., M. D.

Professor of Anatomy

CHARLES M. GRUBER, PH. D.

Professor of Physiology

HON. HAROLD ALEXANDER

Professor of Criminal Law

HON. NEWTON B. VAN DERZEE

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HON. IRVING G. VANN, LL. D.

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Instructor in Dermatology

ERASTUS CORNING, M. D.
Instructor in Medicine

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Instructor in Surgery and Pathology

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Instructor in Surgery

MALCOLM DOUGLAS, M. D.
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Assistant in Dudley Observatory

SHERWOOD B. GRANT, C. E.
Assistant in Dudley Observatory

ALBRECHT VON FLOTOW
Assistant in Dudley Observatory

UNION COLLEGE

Union College was incorporated by the Regents of the University of the State of New York on the 25th day of February, 1795. It was the second college incorporated in the state, and the first north of the city of New York and west of the Hudson river. It received its name from the circumstance that several religious denominations co-operated in its organization, and it was the first college in the United States which was not of a strictly denominational character. It has continued from its foundation to be a representative institution of Christian unity.

The first president of Union College was the Rev. John Blair Smith, of Philadelphia. He was elected in 1795, and resigned in 1799, only a few months before his death. He was succeeded by Jonathan Edwards, the younger, who died in 1801. The Rev. Jonathan Maxcy, previously president of Brown University, succeeded Dr. Edwards, resigning at the end of two years. In 1804 the Rev. Eliphalet Nott was elected president of Union College, which office he held until his death, on the 29th day of January, 1866. The Rev. Laurens P. Hickok, a graduate of the college, who had long acted as vice-president, was elected his successor. He resigned in 1868. The Rev. Charles A. Aiken succeeded Dr. Hickok in 1869, and resigned in 1871. The Rev. Eliphalet Nott Potter was elected president in 1871, and was inaugurated June 20, 1872. On his resignation, in 1884, the Hon. Judson S. Landon was appointed president *ad interim*, and served until the inauguration of Harrison E. Webster, who was elected president May 23, 1888, and inaugurated June 26, 1888. On his resignation, in January, 1894, Rev. Andrew V. V. Raymond was elected president, and was inaugurated in June, 1894. Dr. Raymond resigned July 18, 1907, and the Rev. George Alexander was appointed president *ad interim*. On January 28, 1909, Rev. Charles Alexander Richmond was elected president. Dr. Richmond was inaugurated June 7, 1909.

1915

	S	M	T	W	T	F	S		S	M	T	W	T	F	S
Sept.	..	..	..	1	2	3	4	Nov.	..	1	2	3	4	5	6
	5	6	7	8	9	10	11		7	8	9	10	11	12	13
	12	13	14	15	16	17	18		14	15	16	17	18	19	20
	19	20	21	22	23	24	25		21	22	23	24	25	26	27
Oct.	26	27	28	29	30	..	..	Dec.	28	29	30	..	..	..	..
	..	..	..	..	..	1	2		..	..	..	1	2	3	4
	3	4	5	6	7	8	9		..	..	..	..	..	..	..
	10	11	12	13	14	15	16		5	6	7	8	9	10	11
	17	18	19	20	21	22	23		12	13	14	15	16	17	18
	24	25	26	27	28	29	30		19	20	21	22	23	24	25
	31	..	..	..	..	..	..		26	27	28	29	30	31	..

1916

	S	M	T	W	T	F	S		S	M	T	W	T	F	S
Jan.	..	..	..	..	..	..	1	July	..	..	..	..	..	..	1
	2	3	4	5	6	7	8		2	3	4	5	6	7	8
	9	10	11	12	13	14	15		9	10	11	12	13	14	15
	16	17	18	19	20	21	22		16	17	18	19	20	21	22
	23	24	25	26	27	28	29		23	24	25	26	27	28	29
Feb.	30	31	..	..	..	..	..	Aug.	30	31	..	..	..	..	..
	..	..	1	2	3	4	5		..	..	..	1	2	3	4
	6	7	8	9	10	11	12		6	7	8	9	10	11	12
	13	14	15	16	17	18	19		13	14	15	16	17	18	19
	20	21	22	23	24	25	26		20	21	22	23	24	25	26
Mar.	27	28	29	..	..	..	..	Sept.	27	28	29	30	31	..	..
	..	..	..	1	2	3	4		..	..	..	..	..	1	2
	5	6	7	8	9	10	11		3	4	5	6	7	8	9
	12	13	14	15	16	17	18		10	11	12	13	14	15	16
	19	20	21	22	23	24	25		17	18	19	20	21	22	23
Apr.	26	27	28	29	30	31	..	Oct.	24	25	26	27	28	29	30

	2	3	4	5	6	7	8		1	2	3	4	5	6	7
	9	10	11	12	13	14	15		8	9	10	11	12	13	14
	16	17	18	19	20	21	22		15	16	17	18	19	20	21
May	23	24	25	26	27	28	29	Nov.	22	23	24	25	26	27	28
	30	..	..	..	..	..	..		29	30	31	..	..	..	..
	..	..	1	2	3	4	5		..	..	..	1	2	3	4
	7	8	9	10	11	12	13		5	6	7	8	9	10	11
	14	15	16	17	18	19	20		12	13	14	15	16	17	18
June	21	22	23	24	25	26	27	Dec.	19	20	21	22	23	24	25
	28	29	30	31	..	..	..		26	27	28	29	30	..	..
	..	..	..	..	1	2	3		..	..	..	..	1	2	3
	4	5	6	7	8	9	10		3	4	5	6	7	8	9
	11	12	13	14	15	16	17		10	11	12	13	14	15	16
	18	19	20	21	22	23	24		17	18	19	20	21	22	23
	25	26	27	28	29	30	..		24	25	26	27	28	29	30
									31	..	..	..	..	..	..

Figures in heavy type indicate days on which Union College is in session

UNION COLLEGE CALENDAR

1915

Conditions examinations.....	Saturday, September 18
Registration day for freshmen.....	Monday, September 20
Entrance examinations....	Tuesday-Wednesday, September 21-22
Registration.....	Tuesday-Wednesday, September 21-22
First chapel exercises and recitations...	Thursday, September 23
Senior reception to entering students.....	Friday, September 24
Election day — recess.....	Tuesday, November 2
Thanksgiving day — recess, three days..	Thursday, November 25
Allison-Foote prize debate.....	Friday, December 3
Conditions examinations.....	Friday-Saturday, December 3-4
Christmas recess.....	Thursday, December 23

1916

Recitations resumed.....	Tuesday, January 4
Day of prayer for colleges.....	Thursday, January 20
Examinations, first semester.....	Wednesday, January 26
First semester ends.....	Saturday, February 5
Registration, second semester.....	Monday, February 7
Recitations begin.....	Tuesday, February 8
Washington's birthday — recess.....	Tuesday, February 22
Conditions examinations.....	Friday-Saturday, April 14-15
Selection of junior and sophomore orators....	Saturday, April 15
Easter recess.....	Friday-Monday, April 21-24
Presentation of prize essays.....	Monday, May 1
Senior examinations begin.....	Monday, May 22
Senior examinations end.....	Saturday, May 27
Memorial Day — recess.....	Tuesday, May 30
Examinations begin, second semester.....	Wednesday, May 31
Examinations end, second semester.....	Saturday, June 10
Baccalaureate sermon.....	Sunday, June 11
Prize oratory of juniors and sophomores.....	Monday, June 12
Meeting of trustees, societies, alumni.....	Tuesday, June 13
President's reception.....	Tuesday, June 13
Commencement, second Wednesday in June..	Wednesday, June 14
Entrance examinations.....	Thursday-Friday, June 15-16
Conditions examinations.....	Saturday, September 16
Fall Term, 1916-17, begins.....	Monday, September 18

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 expiring June, 1916

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 expiring June, 1917

WILLIAM PLATT ADAMS, A. B., Red Hook, term of office
 expiring June, 1918

HIRAM C. TODD, Saratoga, term of office expiring June, 1919

* Deceased.

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Room 5, Washburn Hall

DEWITT CLINTON

Librarian

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JANE TUPER, Clerk to the Secretary

ANNE O'N. BEATTIE, Secretary to the President

IRENE T. HIBBARD, Cataloguer in Library

*Except Saturday P. M.

COURSES OF STUDY

1. Courses leading to the Degree of A. B.

Classical Course A. Greek, as indicated on page 38, is required for admission to this course. Latin and Greek are required for two years. In the last two years of this course all studies are elective.

Classical Course B. This course may be pursued by candidates who satisfy the requirements for admission to the Ph. B. course. Greek is begun on entrance and required for two years. In other respects Course B is identical with Course A for the first two years. In the last two years of the course all studies are elective.

2. Course leading to the Degree of Ph. B.

Latin-Scientific Course. This course offers Latin without Greek, for which is substituted additional work in modern languages and science. In the last two years of the course all studies are elective.

3. Course leading to the Degree of B. S.

Scientific Course. This course is based upon the study of mathematics and the sciences, with extended work in English and other modern languages. In the last two years of the course all studies are elective.

Students in full standing at the end of junior year who have the profession of medicine in view are permitted to take the first year studies of the Albany Medical College as a substitute for the studies of the senior year in Union College. This enables medical students to lessen the time of their academic and professional studies by one year. The academic degree is conferred on the successful completion of the first year in the Medical College.

4. Courses leading to the Degree of B. E.

General Engineering Course. This course offers the foundation of a broad engineering education, comprising mathematics, the sciences, the fundamental principles of the special branches of the profession, some training in history and economics, a knowledge of both French and German, and a course in English.

During the third and fourth years two alternative options are offered.

Option A. In this division the fundamental principles of advanced technical subjects receive emphasis.

Option B. In this division studies are offered which lead to a training for engineering positions of an executive or administrative nature.

Sanitary Engineering Course. This differs from the general engineering course by substituting special work in sanitary engineering for some of the general engineering studies of the junior and senior years.

Electrical Engineering Course. This course is intended to give a broad and thorough engineering education, with the specific instruction requisite for electrical engineering. During the first two years of the course the work is the same as in the general engineering department; during the junior and senior years the two courses are wholly distinct.

5. One Year Pre-Medical Course

This course is offered to meet the requirements for admission to the Medical Department of Union University in accordance with the recommendations of the American Medical Association.

6. Courses leading to Graduate Degrees

Course leading to degree of M. C. E. This course of one year's graduate study, consists of lectures, laboratory practice and research work, and is open to graduates of the general or the sanitary engineering course of Union College, or of any other institution of a standing recognized by the faculty.

Course leading to degree of M. S. in E. E. This course of one year's graduate study, consists of lectures, laboratory practice and research work, and is open to graduates of the electrical engineering course of Union College, or of any other institution of a standing recognized by the faculty.

Course leading to degree of Ph. D. This course of two years' graduate study requires for admission the degree of M. S. in E. E. or an equivalent. For details of the work see page 114.

REQUIREMENTS FOR ADMISSION

Application and Registration

Blank forms of application to be filled out and forwarded in advance will be furnished by the secretary on request.

Candidates must be at least sixteen years old, and as a preliminary to registration, whether for examination or for enrollment, must present themselves at the office of the secretary on the date named in the calendar published in the college catalogue for the current year, and submit satisfactory testimonials of character.

Methods of satisfying the Requirements

By Examination. The regular entrance examinations are held on the Thursday and Friday immediately following Commencement, and on the Tuesday and Wednesday of the first week of the fall term. The schedule of examinations is given on pages 42-43. Candidates for examination in any subject are expected to present a recommendation from their school principal.

By C. E. E. B. Certificate. Candidates may take the uniform entrance examinations offered by the College Entrance Examination Board. The examinations of the board are held in June of each year, and a list of the places at which they are to be held is published by the board about March 1st. Applications to attend the board's examinations must be addressed to *College Entrance Examination Board, Hamilton Hall, 1134 Amsterdam Avenue, New York, N. Y.*, and must be made upon a blank form to be obtained from the secretary of the board upon application. The certificates of this board will be accepted for all subjects passed at a satisfactory grade.

By Regents Diploma. The academic and college entrance diplomas issued by the New York State Education Department will be accepted so far as they cover the requirements for admission to the course desired.

By School Certificate. Certificates from schools approved by the faculty will be accepted for graduates of the school if they

cover the requirements for admission to the course desired and contain a recommendation from the principal of the school that the candidate be admitted to college. Blank certificates, to be filled out by principals of schools, will be furnished upon application to the *Secretary of the Faculty, Union College, Schenectady, N. Y.*

So far as possible all credentials should be forwarded by July 10 of the year in which the candidate desires to enter, and it is expected that all certificates will be submitted not later than September 1st.

Students who enter the freshman class by certificate and fail to maintain their class standing are required to pass entrance examinations in the departments in which they have failed, if they apply for readmission.

Subjects Required for Admission to Each Course

Candidates for admission to the freshman class in any course must meet the requirements specified for that course. The subjects are numbered as in the general list given on pages 32-42.

The term *unit* is used in this catalogue in the sense established by the Carnegie Foundation and the College Entrance Examination Board, and means a course of 4 or 5 periods weekly throughout an academic year of the preparatory school.

A.B. Course, A. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
2. Greek: a, b	See Page 38.....	3 units
3. Latin: a, b, c, d.	See Page 38.....	4 units
5. Mathematics: a, b.	See Page 40.....	2½ units
8. Electives.	See Page 42.....	1½ units
Total		14 units

Ph.B. Course and A.B. Course B. For admission to these courses the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
3. Latin: a, b, c, d.	See Page 38.....	4 units
4. Modern Languages: a or b.	See Page 39.....	2 units
5. Mathematics: a, b.	See Page 40.....	2½ units
7. History: a, b, c.	See Page 41.....	2 units
8. Electives	See Page 42.....	½ unit
Total		14 units

B.S. Course. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
*4. Modern Languages: a or b...	See Page 39.....	2 units
5. Mathematics: a, b, c.....	See Page 40.....	3 units
6. Science.....	See Page 41.....	1 unit
7. History: c.....	See Page 41.....	1 unit
*8. Electives.....	See Page 42.....	4 units

Total 14 units

* Latin a-d, page 38, may be substituted for the requirement in modern languages. Latin a-d and Greek a-b, page 38, may be substituted for the requirement in modern language and electives.

B.E. Course. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
4. Modern Languages: a or b...	See Page 39.....	2 units
5. Mathematics: a, b, c.....	See Page 40.....	3 units
6. Science.....	See Page 41.....	1 unit
7. History: c.....	See Page 41.....	1 unit
8. Electives.....	See Page 42.....	4 units

Total 14 units

Pre-Medical Course. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 32.....	3 units
4. Modern Languages: a or b...	See Page 39.....	2 units
5. Mathematics: a, b, c.....	See Page 40.....	3 units
6. Science.....	See Page 41.....	1 unit
7. History: c.....	See Page 41.....	1 unit
8. Electives.....	See Page 42.....	4 units

Total 14 units

Advanced Standing. Candidates from other colleges must bring letters of honorable dismissal, and upon the presentation of acceptable certificates will be admitted to corresponding standing. Candidates for a degree must enter not later than the beginning of the senior year.

Requirements in Individual Subjects

1. English (3 units)

The study of English in school has two main objects: (1)

command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence, and appreciation.

The following is the requirement for the years 1916-1919. In 1916, however, those who have made preparation according to the former requirement, as announced in the Catalogue for 1914-15, will be admitted under that requirement.

Grammar and Composition

The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences, and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description, and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge, and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature

The second object is sought by means of two lists of books, headed respectively *Reading* and *Study*, from which may be framed a progressive course in literature covering four years. In connection with both lists, the student should be trained in reading aloud and be encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. Reading

The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature,

by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least *two* selections are to be made, except as otherwise provided under Group I.

GROUP I. Classics in Translation.

The Old Testament, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther. The Odyssey, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII. The Iliad, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI. The Aeneid. The Odyssey, Iliad and Aeneid should be read in English translations of recognized literary excellence. For any selection from this group a selection from any other group may be substituted.

GROUP II. Shakespeare

Midsummer-Night's Dream, Merchant of Venice, As You Like It, Twelfth Night, The Tempest, Romeo and Juliet, King John, Richard II, Richard III, Henry V, Coriolanus, Julius Caesar, Macbeth, Hamlet. The last three if not chosen for study under B.

GROUP III. Prose Fiction

Malory, Morte d'Arthur (about 100 pages); Bunyan, Pilgrim's Progress, Part I; Swift, Gulliver's Travels (voyages to Lilliput and to Brobdingnag); Defoe, Robinson Crusoe, Part I; Goldsmith, Vicar of Wakefield; Frances Burney, Evelina; Scott's Novels, any one; Jane Austen's Novels, any one; Maria Edgeworth, Castle Rackrent, or The Absentee; Dickens' Novels, any one; Thackeray's Novels, any one; George Eliot's Novels, any one; Mrs. Gaskell, Cranford; Kingsley, Westward Ho! or Hereward the Wake; Reade, The Cloister and the Hearth; Blackmore, Lorna Doone; Hughes, Tom Brown's Schooldays; Steven-

son, *Treasure Island*, or *Kidnapped*, or *Master of Ballantrae*; Cooper's Novels, any one; Poe, *Selected Tales*; Hawthorne, *The House of the Seven Gables*, or *Twice Told Tales*, or *Mosses from an Old Manse*; a collection of *Short Stories* by various standard writers.

GROUP IV. Essays, Biography, etc.

Addison and Steele, *The Sir Roger de Coverley Papers*, or selections from the *Tatler* and the *Spectator* (about 200 pages); Boswell, selections from the *Life of Johnson* (about 200 pages); Franklin, *Autobiography*; Irving, selections from the *Sketch Book* (about 200 pages), or *Life of Goldsmith*; Southey, *Life of Nelson*; Lamb, selections from the *Essays of Elia* (about 100 pages); Lockhart, selections from the *Life of Scott* (about 200 pages); Thackeray, lectures on Swift, Addison and Steele in the *English Humorists*; Macaulay, any one of the following essays: Lord Clive, Warren Hastings, Milton, Addison, Goldsmith, Frederick the Great, Madame d'Arblay; Trevelyan, selections from the *Life of Macaulay* (about 200 pages); Ruskin, *Sesame and Lilies*, or *Selections* (about 150 pages); Dana, *Two Years before the Mast*; Lincoln, *Selections*, including at least the two *Inaugurals*, the *Speeches in Independence Hall* and at *Gettysburg*, the *Last Public Address*, the *Letter to Horace Greeley*, together with a brief memoir or estimate of Lincoln; Parkman, *The Oregon Trail*; Thoreau, *Walden*; Lowell, *Selected Essays* (about 150 pages); Holmes, *The Autocrat of the Breakfast Table*; Stevenson, *An Inland Voyage and Travels with a Donkey*; Huxley, *Autobiography* and selections from *Lay Sermons*, including the addresses on *Improving Natural Knowledge*, *A Liberal Education*, and *A Piece of Chalk*; a collection of *Essays* by Bacon, Lamb, DeQuincey, Hazlitt, Emerson, and later writers; a collection of *Letters* by various standard writers.

GROUP V. Poetry

Palgrave's *Golden Treasury* (First Series), Books II and III, with special attention to Dryden, Collins, Gray, Cowper, and Burns; Palgrave's *Golden Treasury* (First Series), Book IV, with special attention to Wordsworth, Keats, and Shelley (if not chosen for study under B); Goldsmith, *The Traveller* and *The*

Deserted Village; Pope, The Rape of the Lock; a collection of English and Scottish Ballads, as, for example, some Robin Hood ballads, The Battle of Otterburn, King Estmere, Young Beichan, Bewick and Grahame, Sir Patrick Spens, and a selection from later ballads; Coleridge, The Ancient Mariner, Christabel, and Kubla Khan; Byron, Childe Harold, Canto III or IV, and The Prisoner of Chillon; Scott, The Lady of the Lake, or Marmion; Macaulay, The Lays of Ancient Rome, The Battle of Naseby, The Armada, Ivry; Tennyson, The Princess, or Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Browning, Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, Hervé Riel, Pheidippides, My Last Duchess, Up at a Villa — Down in the City, The Italian in England, The Patriot, The Pied Piper, "De Gustibus" —, Instans Tyrannus; Arnold, Sohrab and Rustum, and The Forsaken Merman; selections from American Poetry, with special attention to Poe, Lowell, Longfellow, and Whittier.

B. Study

This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

GROUP I. Drama

Shakespeare, Julius Caesar, Macbeth, Hamlet.

GROUP II. Poetry

Milton, L'Allegro, Il Penseroso, and either Comus or Lycidas; Tennyson, The Coming of Arthur, The Holy Grail, and The Passing of Arthur; the selections from Wordsworth, Keats, and Shelley in Book IV of Palgrave's Golden Treasury (First Series).

GROUP III. Oratory

Burke, Speech on Conciliation with America; Macaulay's two Speeches on Copyright and Lincoln's Speech at Cooper Union;

Washington's Farewell Address and Webster's First Bunker Hill Oration.

GROUP IV. Essays

Carlyle, Essay on Burns, with a selection from Burns's Poems; Macaulay, Life of Johnson; Emerson, Essay on Manners.

Examination

Any examination set will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

However accurate in subject-matter, no paper can be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading. For this purpose the examiner will provide several subjects, perhaps eight or ten, from which the candidate may make his own selections. He will not be expected to write more than four hundred words per hour.

The examination in literature will include:

a. General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under *A. Reading*, above. The candidate will be required to submit a list of the books read in preparation for the examination, certified by the principal of the school in which he was prepared; but this list will not be made the basis of detailed questions.

b. A test on the books prescribed for study, which will consist of questions upon their content, form, and structure, and

upon the meaning of such words, phrases, and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

2. Greek (2 units)

a. **Grammar and Composition** (1 unit). The common forms, idioms, and constructions, and the general grammatical principles of Attic Greek prose. Translation into Greek of detached sentences and very easy continuous prose based upon the *Anabasis*.

b. **Xenophon** (1 unit). The first four books of the *Anabasis*.

c. **Homer** (1 unit). The *Iliad*, book I, book II, 1-483, and book III; Homeric constructions, forms, and prosody.

In connection with the reading in Greek there should be constant practice in sight translation and in prose composition.

3. Latin (4 units)

a. **Grammar and Composition** (1 unit). The inflections; the simpler rules for composition and derivation of words; syntax of cases and the verb; structure of sentences in general, with particular regard to relative and conditional sentences, indirect discourse, and the subjunctive. Translation into easy Latin of detached sentences and very easy continuous prose based upon Caesar and Cicero.

b. **Caesar** (1 unit). Any four books of the *Gallic War*.

c. **Cicero** (1 unit). Any six orations from the following list, or equivalents: The four orations against Catiline, Archias, The Manilian Law, Marcellus, Roscius, Milo, Sestius, Ligarius, the fourteenth *Philippic*.

d. **Vergil** (1 unit). The first six books of the *Aeneid*, and so much prosody as relates to accent, versification in general, and dactylic hexameter.

Equivalents in b, c, or d, will be accepted at the discretion of the head of the department.

Every student is required to use in the college class room the Roman Method of pronunciation, and is expected to have had practice in this method at school.

4. Modern Languages (2 units)

a. German (2 units). Two years' work will be necessary to meet this requirement.

During the first year the work should comprise: 1. careful drill upon pronunciation; 2. the memorizing and frequent repetition of colloquial sentences; 3. drill upon the rudiments of grammar, that is, upon the inflection of the article, of such nouns as belong to the language of every-day life, of adjectives, pronouns, weak verbs, and the more usual strong verbs; also upon the use of the more common prepositions, the simpler uses of the modal auxiliaries, and the elementary rules of syntax and word-order; 4. abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; 5. the reading of from 75 to 150 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson, the teacher giving the English, and in reproducing from memory sentences previously read.

During the second year the work should comprise: 1. the reading of from 150 to 250 pages of literature in the form of stories and plays; 2. accompanying practice, as before, in the translation into German of easy variations upon the matter read and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; 3. continued drill upon the rudiments of the grammar, with constant applications in the construction of sentences.

b. French (2 units). Two years' work will be necessary to meet this requirement.

During the first year the course should include: 1. careful drill in pronunciation; 2. the rudiments of grammar, including the inflection of the regular and the more common irregular

verbs, the plural nouns, the inflection of adjectives, participles, and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence and the elementary rules of syntax; 3. abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; 4. the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice of translating into French easy variations of the sentences read, the teacher giving the English, and in reproducing from memory sentences previously read; 5. writing French from dictation.

During the second year the work should comprise: 1. the reading of from 250 to 400 pages of easy modern prose in the form of stories, plays, or historical or biographical sketches; 2. constant practice, as in the previous year, in translating into French easy variations upon the texts read; 3. frequent abstracts, sometimes oral and sometimes written, or portions of the text already read; 4. writing French from dictation; 5. continued drill upon the rudiments of grammar, with constant application in the construction of sentences; 6. mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

5. Mathematics ($2\frac{1}{2}$ units; 3 units)

a. Algebra. ($1\frac{1}{2}$ units). The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions, ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and of numbers; exponents, including the fractional and negative.

Simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations.

Problems depending upon quadratic equations.

The binomial theorem for positive integral exponents.

The formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

b. Plane Geometry (1 unit). The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle.

The solution of numerous original exercises, including loci problems.

Application to the mensuration of lines and plane surfaces.

c. Solid Geometry ($\frac{1}{2}$ unit). The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms; pyramids, cylinders, and cones; the sphere and the spherical triangle.

The solution of numerous original exercises, including loci problems.

Applications to the mensuration of surfaces and solids.

6. Science (1 unit)

The work in science may be offered in any of the departments named below. The figure in parenthesis shows the unit value:

- a. Physics (1)
- b. Chemistry (1)
- c. Biology (1)
- d. Zoology (1)
- e. Botany (1)

In every instance the work expected is that outlined for the given subject in the reports of the College Entrance Examination Board and the Carnegie Foundation, or in the Syllabus of the New York State Education Department.

7. History (1 unit; 2 units)

a. Greek History ($\frac{1}{2}$ unit.) In this study must be included the geography of ancient Greece.

Schedule of the June Examinations*Thursday, June 15*

8.30 A. M. Candidates register at the office of the secretary

English a	Page 33	9 A. M. to	11 A. M.
English b	" 36	11 A. M. "	1 P. M.
Mathematics a	" 40	2 P. M. "	4 P. M.
Mathematics b, c.....	" 40	4 P. M. "	6 P. M.

Friday, June 16

Greek, Latin	Page 38	9 A. M. to	11 A. M.
French, German	" 39	11 A. M. "	1 P. M.
History	" 41	2 A. M. "	4 P. M.
Science	" 41	4 P. M. "	6 P. M.

Schedule of the September Examinations*Monday, September 18*

9 A. M. Candidates register at the office of the secretary.

Tuesday, September 19

English a	Page 33	9 A. M. to	11 A. M.
English b	" 36	11 A. M. "	1 P. M.
Mathematics a	" 40	2 P. M. "	4 P. M.
Mathematics b, c.....	" 40	4 P. M. "	6 P. M.

Wednesday, September 20

Greek, Latin	Page 38	9 A. M. to	11 A. M.
French, German.....	" 39	11 A. M. "	1 P. M.
History	" 41	2 P. M. "	4 P. M.
Science	" 41	4 P. M. "	6 P. M.

DEPARTMENTS OF INSTRUCTION

NON-TECHNICAL

The Greek Language and Literature

PROFESSOR BENNETT AND ASSISTANT PROFESSOR FOBES

The courses leading to the degree of bachelor of arts at Union College are classical courses, Greek as well as Latin being required of all candidates for that degree. Two courses are offered. Greek is required for admission to course A and during the freshman and sophomore years. In course B Greek is begun on entrance and required to the end of the sophomore year. Except English composition all studies are elective for classical students in the junior and senior years, and may be chosen in any of the main departments of knowledge taught. The modern languages taken in the freshman and sophomore years may be continued and other modern languages begun. Preparation to meet requirements of medical colleges in science may be made by election. Course B as given prior to 1915-1916 is continued for students already entered in it.

The aim of the formal instruction in Greek is to impart an exact knowledge of the Greek language and a thorough acquaintance with a few good Greek books. The books read are varied from year to year; but the sophomore courses are always in history and afford an introduction to the elective courses in history offered in the junior and senior years. Collateral reading in history, archaeology, art, language, and literature is required of all students in Greek and is tested by examination. English composition is taught in connection with the study of Greek in the freshman year.

The courses for the year 1915-1916 are as follows:

1. Xenophon: The Oeconomicus. **Plato:** The Apology and the Crito. **Homer:** Odyssey, Book I, and Iliad, Book XXIV. **Composition:** Oman's History of Greece.

Required of freshmen in course A. Five hours weekly throughout the year.

1a. Benner and Smyth's Beginner's Greek Book. **Xenophon:** Anabasis, Books I and II.

This course aims in the first half of the year to ground the student thoroughly in the elements of the language, in the second half, through careful study of a small amount of Attic prose, to fit him to begin intelligently the study of the great classical writers. Incidentally, attention is frequently paid to the use of Greek in scientific nomenclature.

Required of freshmen in course B. Five hours weekly throughout the year.

2. **Herodotus:** Selections. **Aeschylus:** The Persians. **Thucydides:** Book I, and the Funeral Oration of Pericles. **Demosthenes:** The First and Third Philippics. **Composition:** Roman and mediaeval history. Hogarth's Philip and Alexander of Macedon.

Required of sophomores in course A. Four hours weekly throughout the year.

3. **Aeschylus:** Prometheus Bound. **Sophocles:** Oedipus Tyrannus. **Euripides:** Medea. **Homer:** Selected books of the Iliad and the Odyssey, and the Hymn to Demeter. Tarbell's History of Greek Art. Gilbert Murray's Euripides and His Age. Jebb's Introduction to Homer. Butcher's Some Aspects of the Greek Genius.

Elective for juniors and seniors in course A. Three hours weekly throughout the year.

3a. Goodell's The Greek in English. Salomon Reinach's Eulalie. Ball's The Elements of Greek. Dawes's Attic Greek Vocabularies. Anabasis, Books I and II.

Required of students in course B of the class of 1917. Three hours weekly throughout the year.

4. **Plato:** The Apology and the Crito. **Demosthenes:** On the Chersonesus. **Euripides:** Alcestis. Dickinson's The Greek View of Life. Tarbell's History of Greek Art. Hogarth's Philip and Alexander of Macedon. Gilbert Murray's Euripides and His Age.

Required of students in course B of the class of 1916. Three hours weekly throughout the year.

5. **Honor Course.** **Plato:** The Phaedo. **Aristotle:** The Ethics. Gomperz's Greek Thinkers. Thesis.

In addition to studying special topics in the philosophy of Plato and Aristotle, this course will attempt to sketch the chief outlines of the Aristotelian system and to trace some of the routes by which Aristotelianism has influenced mediaeval and modern thought.

Open to seniors who have complied with the requirements for special honors. Candidates are required to take also Greek 3 and Latin 4. Three hours weekly throughout the year.

The Latin Language and Literature

PROFESSOR KELLOGG

The studies of this department are required, in the freshman and sophomore years, of all students who are candidates for either one of the two degrees, A. B. and Ph. B. In the junior and senior years Latin becomes an elective study, except for students who are candidates for honors in Latin; of them it is required.

1. **Livy:** Selections from Books I, XXI and XXII. **Roman history.** **Tacitus:** Agricola and Germania. **Cicero:** De Senectute or De Amicitia or Selected Letters. Latin composition.

The work of the first year includes a thorough review of forms and syntax through oral and written prose composition and sight reading. Selections from the three great masters of Roman prose are made the basis for grammatical and literary analysis and interpretation, and also, through lectures and assigned reading, for the study of Roman history through the reign of Trajan.

Required of freshmen in the A. B. and Ph. B. courses. Four hours weekly throughout the year.

2. **Terence:** Adelphoe. **Plautus:** Menaechmi or an equivalent. **Horace:** Selected Odes and Epodes. **Catullus:** Selected poems.

Through lectures on ancient comedy and lyric, and by collateral reading, the student is made acquainted with the history of Roman literature under the Republic. The grammatical analysis aims to make familiar the chief characteristics of early and colloquial Latin, and the general economy of poetic diction;

the literary interpretation centers chiefly around the influence of Greek life and thought on Roman literature, and the national and personal elements in Latin poetry.

Required of sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

3. Horace (Satires and Epistles) and **Juvenal**. **Pliny the Younger** or **Cicero** (Letters), or **Martial** (Epigrams).

This course, through lectures and assigned reading, continues the history of Roman literature under the Empire. A brief introduction to Roman archaeology (with special study of the Forum Romanum) are given, and in connection with the Pliny an outline of the private life of the Romans.

Elective for juniors in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

4. Lucretius: Books I and III or V and Selections, with lectures on didactic poetry, the atomic theory, and the philosophic system of Epicurus. The literature of the Empire is illustrated by readings from **Seneca** (Moral Epistles) or **Quintilian** (Book X on literary criticism) or **Suetonius** (Lives of Julius Caesar and Augustus) or **Martial** (Selected Epigrams).

As this course is not only for those who elect to study Roman life and literature but also for those who may desire to use Latin in teaching or as an instrument in later research work, special assignments are given from authors or inscriptions for practice in editing, or the writing of history from the sources.

Elective for seniors in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

5. Roman Law. When a sufficient number of seniors electing course 4 desire it, one or both semesters may be devoted to an introduction to Roman Law, based on the Institutes of Justinian and Robinson's Selections from Roman Law.

In general, subsidiary reading will be recommended. Equivalents may be substituted in the elective programme at any time, and the order of the subjects as given above may be altered in any one of the four years at the discretion of the head of the department.

6. **Honor Course.** Studies in the life and works of Vergil. Open to seniors who have complied with the requirements for special honors. Three hours weekly throughout the year.

Modern Languages

PROFESSOR BARNES, ADJUNCT PROFESSOR MARCH,
ASSISTANT PROFESSOR STEWART, MR. ATKINSON,
MR. PARKER, AND MR. TILLY

The courses in German, French, and Spanish have a twofold object, to give the student such control of the language that he may be able to use it as an instrument in study and research, and to open to him another path to general training and culture. They aim to enable him to read modern texts without translation and to give him some facility in the independent use of the language. In the academic courses the literary side of the study is made prominent; in the engineering division emphasis is laid on those phases of the language which are peculiar to technical and scientific writing. From the beginning the language studied is made so far as possible the language of the class room.

1. **German 1.** Grammar and reading; drill on inflection and the more usual constructions, with special attention to pronunciation and vocabulary. Reading of elementary scientific texts.

Required in the B. E. course of freshmen who offer French at entrance. Three hours weekly throughout the year.

2. **German 1a.** Grammar for review and reference; exercises in syntax; practice in writing German. The reading of the class is mainly in Scientific German, but other matter is also read and suitable selections are assigned for outside study and made the basis of tests and themes. In any year the equivalent of at least two of the following scientific works and one of the others are read.

Wallentin: Grundzüge der Naturlehre

Du Bois-Reymond: Wissenschaftliche Vorträge

Lassar-Cohn: Die Chemie im täglichen Leben

Muller: Die elektrischen Maschinen

Hauff: Lichtenstein; Freytag: Das Nest der Zaunkönige, Soll

und Haben; Sudermann: Frau Sorge; Storm: Der Schimmelreiter; Meyer: Das Amulett, Der Heilige.

Required of freshmen in the A. B. course A and in the B. E. course who offer German for entrance. Three hours weekly throughout the year.

3. **German 1b.** Grammar for review and reference, with exercises and drill on syntax; writing and reproduction, with colloquial practice and work in vocabulary building based on a course in German composition. Reading and discussion of works selected from the classics, from nineteenth century drama and fiction, and from historical writings. In 1915-16 one or more works from each of at least four of the following groups will be read:

Lessing: Minna von Barnhelm, Emilia Galotti

Goethe: Götz von Berlichingen, Egmont

Schiller: Maria Stuart, Die Jungfrau von Orleans

Freytag: Die Journalisten; Moser: Der Bibliothekar; Ernst: Flachsmann als Erzieher.

Chamisso: Peter Schlemihl; Ludwig: Zwischen Himmel und Erde; Hauff: Lichtenstein; Freytag: Soll und Haben; with others to be assigned for outside reading.

Sybel: Die Erhebung Europas gegen Napoleon; Ranke: Kaiserwahl Karls des V; Freytag: Bilder aus der deutschen Vergangenheit (selections); Schiller: Egmonts Leben und Tod.

Required in the Ph. B. and B. S. courses of freshmen who offer German for entrance. Five hours weekly throughout the year.

Sophomores who offer French for entrance but have also had two years of German take this course in place of German 2.

4. **German 2.** A course in grammar, composition and reading; easy selections in prose and poetry, historical matter, a novel and a play are read. While thorough preparation and careful drill are insisted upon throughout, the amount of reading demanded is considerable.

Required in the A. B. course A and in the Ph. B. and B. S. courses of sophomores who offer French at entrance. Alternate with French for sophomores in the A. B. course B. Five hours weekly throughout the year.

5. **German 3.** Grammar reviewed and continued, with chief attention to case and verb construction, idioms, and the translation of English into German; reading for vocabulary based on a colloquial novel; rapid reading of selected works. In 1915-16 one or more books from each of the following groups will be read.

Schiller: Wilhelm Tell, Historische Skizzen

Goethe: Götz von Berlichingen, Hermann und Dorothea

Sudermann: Frau Sorge, Der Katzensteg

Elective in the A. B., Ph. B. and B. S. courses for juniors who have passed German 2 with a grade of 80 or more, or German 1b with a grade between 70 and 85. Three hours weekly throughout the year.

6. **German 3a.** Course (a) below and one of the others, or parts of two or more of them:

a) Advanced composition, with short independent essays; studies in words and their uses, with some drill on derivations and etymology; journalistic German, with sight readings from current newspapers and periodicals.

b) A study of some of the more recent prose literature, especially the novel; works of Storm, Keller, Meyer, Sudermann, and others.

c) A continuation of the classics begun in German 1b; reading and discussion of additional works of Lessing, Schiller and Goethe; Biedermann: Deutsche Bildungszustände im 18. Jahrhundert.

d) An intensive study of Schiller's life and works.

e) A course of reading in nineteenth century drama, with special attention to Kleist, Hebbel, Grillparzer and Hauptmann.

Elective in the Ph. B. and B. S. courses for juniors who have passed German 1b with a grade of 85 or more. Three hours weekly throughout the year.

7. **German 4.** Language and literature.

a) Advanced composition, with independent themes based on the reading of course (c) below.

b) Kochs Geschichte der deutschen Literatur as a handbook, with lectures, and references to other works.

c) A study of the classical period; Lessing, Goethe and Schiller are discussed in this order and chief attention is given to the following works:

Lessing: Emilia Galotti, Nathan der Weise

Goethe: Faust I (with readings on the Faust legend)

Schiller: Maria Stuart, Jungfrau von Orleans, Wallenstein (with this are read selections from Der 30-jährige Krieg)

Elective in the A. B., Ph. B. and B. S. courses for seniors who have passed German 3 with a grade of 80 or German 3a with a grade between 70 and 85. Three hours weekly throughout the year.

8. **German 4a.** Course (a) below and one of the others, or parts of two or more of them.

a) Advanced composition, with original themes on subjects connected with the reading of the course.

b) A study of Goethe's life and works, with readings from *Dichtung und Wahrheit*, and the poems; *Egmont* (with this is read Schiller's *Egmonts Leben und Tod*), *Iphigenie auf Tauris*, *Torquato Tasso*; *Faust I*, with readings on the Faust legend in literature.

c) A history of German literature, based on Kluges *Geschichte der deutschen National-Literatur*, with assigned studies and parallel readings from an anthology.

d) A course in Middle High German, based on a text-book, with supplementary exercises from other sources.

Elective in the Ph. B. and B. S. courses for seniors who have passed German 3a with a grade of 85 or more. Three hours weekly throughout the year.

9. **French 1.** A beginners' course in grammar and reading, with special attention to pronunciation, vocabulary, and the common forms and idioms. Reading of texts suited to the progress of the class.

Required of freshmen in the A. B. course A and of freshmen in the B. E. course who offer German at entrance. Three hours weekly throughout the year.

10. **French 1a.** A rapid review of the elements of grammar,

and the study of syntax and composition; practice in pronouncing and reading French, by means of reading, dictation, and some conversation; careful translation. In 1915-16 one or more books will be read from each of the following groups:

Daudet: *Tartarin de Tarascon*.

Buffum: *French Short Stories*.

Dumas: *La Tulipe Noire*; Feuillet: *Le Roman d'un Jeune Homme Pauvre*; Hugo: *Hernani*; La Brète: *Mon Oncle et mon Curé*; Labiche et Delacour: *La Cagnotte*; Sand: *La Petite Fadette*.

Required of freshmen in the A. B. course A and of freshmen in the B. E. course who offer French at entrance. Three hours weekly throughout the year.

11. French 1b. This course is like 1a, but includes a wider range of reading, so as to give a general view of the history of French literature. Among the additional books that are read may be:

Corneille: *Le Cid*; Molière: *l'Avare*; Racine: *Athalie*; Bossuet: *Selections*; Le Sage: *Gil Blas*; Beaumarchais: *Le Barbier de Seville*; and selections from Masson's *La Lyre Française* and Lanson's *Histoire de la Littérature Française*.

Required in the Ph. B. and B. S. course of freshmen who offer French for entrance. Five hours weekly throughout the year.

Sophomores who offer German for entrance but have also had two years of French take this course in place of French 2.

12. French 2. A beginners' course in grammar and reading. This course is similar to French 1, but includes more work in composition and reading. The reading may include:

Halévy: *L'Abbé Constantin*; Sand: *La Mare au Diable*; La Biche et Martin: *Le Voyage de M. Perrichon*.

Required in the Ph. B. and B. S. course of sophomores who offer German at entrance. Alternate with German for sophomores in the A. B. course B. Five hours weekly throughout the year.

13. French 3. Grammar reviewed; exercises in vocabulary, idioms and the spoken French in connection with Daudet's

Tartarin de Tarascon. This work is followed by composition and reading. The books read may be:

Zola: *La Débâcle*; Souvestre: *Un Philosophe sous les Toits*; De Musset: selections.

Elective in the A. B., Ph. B. and B. S. courses for juniors who have passed French 2 satisfactorily, or French 1b with a grade of not less than 80. Three hours weekly throughout the year.

14. French 3a. A reading course in nineteenth century literature. Lanson's *Histoire de la Littérature Française* is followed and discussed, and a considerable amount of modern French is read out of class and reported upon. The college library is called into use, and the student should gain some real acquaintance with certain of the modern authors. One hour a week is given to advanced composition, including translations and the writing of themes.

Elective in the Ph. B. and B. S. courses for juniors who have passed French 1b with a grade of 85 or more. Three hours weekly throughout the year.

15. French 4. This course is devoted to the study of some of the classics of the seventeenth century. Selected works of Corneille, Racine, Molière, La Fontaine, and Bossuet are read, together with parts of Lanson's *Histoire de la Littérature Française*. One hour a week is devoted to syntax and composition.

Elective in the A. B., Ph. B. and B. S. courses for seniors who have passed French 3. Three hours weekly throughout the year.

16. French 4a. This course is devoted to the study of Molière, his life, his works, and his age.

Elective in the Ph. B. and B. S. courses for seniors who have passed French 3a satisfactorily. Three hours weekly throughout the year.

17. Spanish 3. Grammar and translation. Commercial selections and newspapers, a recent novel, and a modern play are read.

Elective for juniors in the A. B., Ph. B. and B. S. courses and to seniors in those courses who have not had Spanish in junior year. Three hours weekly throughout the year.

18. Spanish 4. Grammar and composition. One or two dramas of the classical period and one or two modern plays are read, together with some works of recent fiction.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have had Spanish 1. Two hours weekly throughout the year.

The English Language and Literature

PROFESSOR HALE AND ASSISTANT PROFESSOR CHASE

The work of the department includes the study of rhetoric, literature, and the earlier forms of the language. Instruction in argumentation and public speaking is given in another department.

1. Rhetoric and Composition. The aim of this course is to train the student in the use of clear and correct English, written and spoken. The work consists in the study of rhetorical principles and practice in composition. In 1915-16 Slater's Freshman Rhetoric and Woolley's Handbook of Composition were used as text-books. A certain amount of outside reading from English authors is also assigned. Usually, two short themes a week are required, and at intervals of six weeks longer themes. Each student meets the instructor in personal conferences for advice about his individual work.

Required of freshmen. Three hours weekly throughout the year in the Ph. B. and B. S. courses; two hours weekly throughout the year in the B. E. courses.

2. Essays. The practice of English composition is carried on throughout the course. As a rule two essays a semester are written, which are corrected and criticised in individual conferences with the instructor.

Required of sophomores, juniors and seniors in all courses. The requirement for senior engineers includes but one literary essay each semester.

3. Introduction to English Literature. This is a course of general reading aiming to acquaint the student with some of the masterpieces of English literature, to train him in the habit of

careful reading, and to serve as a basis for more advanced study. The program is as follows: In the first semester the subject is the literature of the Elizabethan era, chiefly as seen in the plays of Shakespeare. In 1915-16 Hamlet was read with care, and several other plays in a more cursory manner. Thorndike and Neilson's Facts about Shakespeare is used for reference and additional information. In the second semester the subject is the age of Anne, first, as seen in Thackeray's Henry Esmond, and afterward as shown in the literature of the time.

Required of sophomores in all courses. Three hours weekly throughout the year in the A. B., Ph. B. and B. S. courses, and two hours weekly throughout the year in the B. E. courses.

4. Nineteenth Century Literature. Certain leading men of letters are studied as representative of the life and thought of their age. The subject matter of the course varies from year to year. Two of the following groups are ordinarily selected:

a) Poets of the nineteenth century, with special study of Byron, Wordsworth, Shelley, Keats, Tennyson, and Browning.

b) The Victorian Novel: The reading consists of six novels dealing with different phases of nineteenth century life, as, for instance, Pickwick Papers, Vanity Fair, Cranford, Mill on the Floss, The Ordeal of Richard Feveril, Far from the Madding Crowd.

c) Victorian prose, with especial study of Carlyle, Newman, Ruskin, and Arnold.

d) American literature of the middle nineteenth century.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

5. Early English Literature. The Canterbury Tales are read and as much of Chaucer's other work as time permits. There is a certain amount of linguistic study, which is necessary for an intelligent reading of the text; but the end in view is an understanding of Chaucer's literary skill and his relations to the age in which he lived.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

7. Modern English Literature. A study of the English and

American literature of the present day: its object is to give the student an idea of modern points of view. In 1915-16 the course dealt with fiction, the drama, and poetry.

Elective for seniors in the A. B., Ph. B., and B. S. courses. Three hours weekly throughout the year.

9. Honor Course. Literary Criticism. The foundations of criticism in the classics; the awakening of the critical spirit after the Renaissance; the classical tradition as maintained in English by Ben Johnson, Dryden, Addison, and Dr. Johnson; the attack of the romantic school, represented by Coleridge and Hazlitt; the rise of the historical school; the influence of Taine; the critical ideas of Carlyle, Ruskin, Arnold, and Pater; the critical positions of to-day; a classification of the types of literary criticism; the discussion of fundamental problems in the study of literature.

Open to seniors who have complied with the requirements for special honors. Three hours weekly throughout the year.

Rhetoric and Public Speaking

PROFESSOR MCKEAN

10. Sophomore Orations. The work consists of three distinct parts: (a) formal lectures upon the art of public speaking, together with abundant illustrations and class practice upon the principles involved; (b) the writing of orations under individual criticism; (c) the delivery of these orations before the class, subject to further criticism for both individual and general instruction. Supplemental to this work, still further individual criticism and instruction, based on personal needs, is given all students who enter the various contests regularly held under the auspices of the department.

Required of sophomores in all courses. One hour weekly throughout the year.

11. Junior Orations. The work is like that of course 10, but of an advanced character.

Required of juniors in all courses. One hour weekly throughout the year.

12. Senior Orations. The work is like that of course 10, but of a more advanced character.

Required of seniors in the A. B., Ph. B. and B. S. courses. One hour weekly throughout the year.

13. Argumentation and Debate. The work consists of two distinct parts: (a) the study of the theory of argumentation and debate, based upon a text-book, and pursued by means of recitations, criticisms, discussions, and informal lectures; and (b) practice in the analysis of subjects for debates, in the preparation of briefs and arguments, and in the more formal debates of the class room. Considerable attention is given to parliamentary law, and practice is afforded in the conduct of business sessions.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

14. Advanced Argumentation and Debate. The work is of a more advanced character than that in course 13, and consists of class-room debates; of the discussion of such practical problems as naturally grow out of this work; and of the formal presentation of oral theses, subject to individual criticism and general discussion.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have completed course 13. Three hours weekly throughout the year.

15. Honor Course. Open to seniors who have complied with the requirements for special honors. Two hours weekly throughout the year.

History and Government

PROFESSOR RIPTON AND MR. WALDRON

The work of the department covers three years, beginning with the first term of the sophomore year. The instruction is given by text-book, by lectures, and by library references.

1. Medieval and Modern History. The course begins with a brief study of the Roman Empire and the contribution of the ancient world to modern civilization. Attention is given to events

which have had permanent influence upon the historical development of Europe, and to institutions of enduring importance; among these may be named the medieval church, the feudal institutions, the French monarchy, and the English constitution. The course is designed to form a foundation of historical knowledge which may serve as a preparation for any further study, and to give to the student some acquaintance with methods of historical study and the use of authorities and sources.

Required of sophomores in the Ph. B. and B. S. courses, and of juniors in the B. E. course, Option B. Three hours weekly throughout the year.

2. American History. A study is made of the period of American discovery and exploration and of the colonial period. The main part of the work, however, begins with an examination of the causes of the American Revolution. The course is guided by text-books and lectures, and much work is done in the library among the sources and authorities.

Elective for seniors and juniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year. Required of juniors in the B. E. courses, except in Option B. Two hours weekly throughout the year.

3. French Revolution and Nineteenth Century. This course considers the causes, ideas and progress of the French Revolution and the reconstruction of European politics and society produced by the revolutionary and Napoleonic wars. Attention is then directed to the development of the spirit of nationality, especially in Italy and Germany, and a careful study is made of the political, economic and social progress of Great Britain and the continental states. The course is designed to give a clear understanding of conditions in Europe to-day and the historical processes by which they were brought about.

Elective for juniors and seniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

4. Comparative Politics. (Assistant Professor Hill) A comparative study is made of the constitutions and governments of England, the United States, and the principal nations of continental Europe. Sufficient attention is given to historical origins to

account for characteristic differences, but the work consists mainly of a systematic study of the constitutions, their adoption and methods of amendment, the distribution of governmental powers, and their practical operation, including some account of political parties.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Required of seniors in the B. E. course, Option B. Three hours weekly throughout the year.

5. International Law. Planned to follow the study of the international relations of the European powers, given in History 3, this course provides a study of the nature of international law, its principles and rules as they have been accepted by the nations of the world, and its continuing historical development.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Required of seniors in the B. E. course, Option B (1915-1916). Three hours weekly during the first semester.

This course is followed, in the second semester, by Municipal Government.

Philosophy

PROFESSOR HOFFMAN

The courses in this department begin with the first semester of the junior year and extend through the entire senior year. Logic, elementary psychology and elementary ethics come in the junior year. The more advanced courses, with special studies in philosophy, are taken up in the senior year. Instruction in the various studies of the department is usually given by means of lectures, discussions, and the use of a text-book.

1. Logic. This study is confined to the simple elements of the science. As soon as the rules of correct thinking are mastered, the student is put at once to the analysis of arguments, the chief purpose of the study being to develop skill in detecting fallacies. Extracts from many authors are brought before the class for criticism, and so far as possible they are taken from every field of thought.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the first half of the first semester.

2. Elementary Psychology. This course is designed to acquaint the student with the most obvious facts of his mental experience; and the attempt is made to classify these facts into a system. The relation of psychology to the other sciences is set forth, and the importance of the study is emphasized in that it lays the foundation for all the sciences of man as a political, moral and religious being.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the first semester and the first half of the second semester.

3. Elementary Ethics. Only the outlines of the subject are presented in this course. The ordinary duties of man are pointed out by first describing those concerning himself and those that arise from his relation to others, to nature, and to God.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the second semester.

4. Advanced Psychology. The chief problems discussed in this course are the recent views concerning the nature of perception, the localization of functions and the theories concerning memory, conception, the emotions and the will. The facts of abnormal psychology are also here considered, especially insanity, dreams, hypnotism, telepathy, and the hypothesis of a secondary self.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the first half of the first semester.

5. Advanced Ethics. Some account of the history of ethics is given in this course, and present ethical theories are stated and discussed. The relation of ethics to other sciences is emphasized and much attention is given to the ethical problems involved in such questions as education, taxation, transportation, corporations, the treatment of criminals, the care of the poor, and the formation and dissolution of the family.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the first semester and the first half of the second semester.

6. Evolution of Religion. The object of this course is to show how religion originates and to trace out the steps taken in its development. The chief ideas of the leading religions of the heathen world are critically examined, their excellencies and defects are pointed out, and a comparison of them is made with the special doctrines of the Christian system.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the second semester.

7. History of Philosophy. The attempt is made in this course to go over with considerable detail the general field of philosophy from the earliest times down to the present day. In this way the views of the principal thinkers of the world are presented and discussed upon a great variety of problems, such as the validity of knowledge, the nature of virtue, the foundations of the State and the existence of God. Much is made in this course of the historical connection of the different systems for the purpose of impressing upon the mind of the student the successive steps that have been taken in the actual development of thought.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

8. History and Philosophy of Education. This course is offered to students who intend to enter the teaching profession and who have already taken courses 1, 2, and 3.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

9. Honors. Advanced courses leading to special honors in this department are offered to those students who are qualified to pursue them.

Economics and Sociology

ASSISTANT PROFESSOR HILL

Courses in this department have two general purposes: one, to acquaint student with the development, processes and principles of economic and social life; the other, to provide such definite training in these subjects as the student, upon gradua-

tion, will find desirable or necessary in his practical or professional life.

The aim is to adapt method to subject in such manner that at each point of progress in study the student may attain reasonable mastery of his work. Consequently the lecture, recitation and laboratory methods are combined as much as possible. Class room work is supplemented by library assignments and such outside work as is found desirable.

1. **Economics.** A survey and descriptive study of economic life forms the substance of the first half-year's work. An analytical examination of economic consumption, production and distribution, and their guiding principles, together with the examination of a few special problems, concludes the year's study.

Elective for juniors and seniors in the A. B., Ph. B., and B. S. courses who have had History 1. Required of seniors in the B. E. course, Option B. Three hours weekly throughout the year.

2. **Economics.** This course is designed particularly for engineering students, with the purpose of familiarizing them as much as possible with such economic principles and problems as may be of practical use in daily life.

Required of seniors in the engineering courses, E. E. and G. E., Options A and C. Three hours weekly during the first semester.

3. **Economics.**

a) Economic History of the United States. This course includes a study of the industrial and commercial development of the country and an examination of industrial, commercial and financial problems and policies at various periods down to the present. (First semester).

b) Money and Banking. This course includes such study of the problems of money, business finance and banking as time permits. The work is both theoretical and practical. (Second semester).

Elective for seniors in the A. B., Ph. B. and B. S. courses who have had Economics 1. Three hours weekly throughout the year.

4. **Sociology.**

a) General Survey. A descriptive and analytical course in

social evolution, organization and human association. The course aims to familiarize the student with the general characteristics and principles of social development and social activities. (First semester).

b. **Social Psychology.** A descriptive and analytical course on the operation of the social mind and an examination of the principles connected therewith. (Second semester).

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

5. Municipal Government. The evolution of the modern city is studied in order that the student may secure an appreciation and understanding of the problems of city government. This work is followed by an analytical and comparative study of municipal politics and government. The course aims to help develop efficient citizenship, and to that end, as much as possible, local governmental institutions are studied at first hand.

Required of seniors in the B. E. course, Option B (1915-1916). Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second semester.

This course follows History 5.

Mathematics

PROFESSOR GARIS, ASSISTANT PROFESSOR GARRISON, MR. MAXON,
MR. HUNTLEY AND MR. ROWLAND

The following courses are given:

1. Freshman Mathematics.

a) **Solid Geometry.** In this course a large number of problems and original exercises are given in addition to the formal propositions.

b) **Higher Algebra.** This course begins with a review of the more important operations of elementary and intermediate algebra. It includes determinants, series, and theory of equations.

c) **Plane Trigonometry.** This course includes the theory of plane trigonometry; the solution of triangles; trigonometric equations and identities; De Moivre's theorem, and simple applications.

Required of freshmen in the A. B. and Ph. B. courses. Four hours weekly throughout the year.

2. Freshman Mathematics.

a) Plane Trigonometry. For description of course see 1c.

b) Higher Algebra. For description of course see 1b.

c) Analytical Geometry. This course includes plane and solid analytical geometry and the more important higher plane curves. It aims to show the association of algebra with geometric representation. The calculus method of finding the slope of a conic section is given in addition to the direct geometric method. Simple applications to mechanics and physics are given.

Required of freshmen in the B. S. and B. E. courses. Five hours weekly throughout the year.

3. Analytical Geometry. For description of course see 2c.

Optional for sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

4. Differential and Integral Calculus. This course includes drill in differentiation and integration; the application of derivatives to curves; maxima and minima; the development of series; problems involving rates, curvature, surfaces and volumes; and the application of calculus to problems in mechanics and physics.

Required of sophomores in the B. S. course and elective for juniors in the A. B. and Ph. B. courses who have had course 3. Three hours weekly throughout the year.

4a. Differential and Integral Calculus. This course includes all of 4 and also additional work which is essential for engineering students.

Required of sophomores in the B. E. courses. Four hours weekly during the first semester and three hours weekly during the second semester.

5. Differential Equations. The greater part of this course is given to the treatment of ordinary differential equations and their applications to geometry, electricity, physics and mechanics. A review of the calculus, especially methods of integration, is required.

Required of juniors in the E. E. course and elective for juniors in the B. S. course and seniors in the A. B. and Ph. B. courses who have had course 4. Three hours weekly throughout the year.

6. Advanced Calculus. This course continues the study of partial differential equations with applications. The other subjects treated will be changed from year to year.

Elective for seniors in the B. S. and E. E. courses who have had course 5. Three hours weekly throughout the year.

7. Review and Advanced Mathematics. This course gives a review of the algebra, trigonometry, analytical geometry, calculus and analytical mechanics, required of civil and sanitary engineers during the first three years, showing the logical connection of the several subjects and their application to engineering problems. In connection with this review frequent tests are given. The course also includes some work in advanced calculus.

Required of seniors in the G. E. course. Three hours weekly during the second semester.

8. Honor Course. Candidates will be given advanced work in various subjects suited to their special ability.

Open to seniors who have complied with the requirements for special honors. Three hours weekly throughout the year.

Mechanics and Physics

PROFESSOR OPDYKE AND ASSISTANT PROFESSOR KLEEMAN

For students in the A. B., Ph. B. and B. S. courses, the work in mechanics and physics is elective, during the junior and senior years.

For students in the B. E. course, the work in mechanics and physics is required throughout the sophomore year. This is followed by the study of applied mechanics in the engineering department; and a B. E. student, in case his schedule of hours allows it, may elect physics during his junior and senior years, upon special vote of the faculty.

The collection of apparatus for the illustration of lectures is extensive. It has been secured largely from foreign makers and

includes sets of standard pattern by Koenig, Duboscq, Ruhmkorff, and others. For laboratory work, the supply of apparatus is being enlarged, with the purpose of teaching by the laboratory method chiefly.

The courses in detail are as follows:

1. **General Physics.** This course is intended to give a general presentation of the facts and laws of physics, and the aim is to make the student thoroughly familiar with the chief phenomena of the subject and their explanation. The work begins with the study of mechanics, including statics and kinetics and the elementary properties of matter, and continues through sound, heat, light, magnetism and electricity. Particular emphasis is placed upon laboratory work. Physical laws are taught through direct experiment performed by the student himself; the lectures direct his study. In mechanics, special emphasis is laid upon the solution of problems and upon such analytical treatment as shall give preparation for the applied mechanics of the engineering department; and throughout the whole course the student is encouraged to do individual work and reading.

Required of sophomores in the B. E. course. Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses who have had mathematics 2c or 3. Two laboratory periods and two lectures weekly throughout the year.

2. **Experimental Physics.** The purpose of this course is to continue and to broaden physics 1. It consists of individual work in the laboratory supplemented by lectures and discussions. Instruments of precision are used and skill in accurate work is developed.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have taken physics 1; open to juniors and seniors in the B. E. course upon special vote of the faculty. Two laboratory periods and one lecture period weekly throughout the year.

1a. **General Physics M.** This course is similar to but less extensive than physics 1. It requires no mathematics beyond that required for admission to the B. S. course and is intended for

students in the one year course offered by the college in preparation for admission to the medical department of the university.

Required in the pre-medical course. Two laboratory periods and two lectures weekly throughout the year.

3. Mathematical Physics. This course is open to those who have taken physics 1 and mathematics 5, and aims to carry out and complete the mathematical discussion of some parts of the subject. A discussion of some of the simpler facts and problems of Astronomy is included. A good knowledge of calculus is required, and an elementary knowledge of differential equations. Some time is devoted to a further study of differential equations as applied to physical problems, and through lectures and assignments of reading the student is introduced to more advanced work.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have taken Physics 1; open to juniors and seniors in the B. E. course upon special vote of the faculty. Three hours weekly throughout the year.

4. The Electron Theory. This course treats of the nature and properties of ions in gases, solids and liquids; the electronic constant; radio-active changes; the propagation of X, B and Y rays; the ionisation of matter by various ionizing agents; and the electron theory of matter.

Opportunity for research is provided.

Open to graduate students; elective for seniors in the A. B., Ph. B. and B. S. courses who have had physics 1 and are taking physics 3. Open to juniors and seniors in the B. E. course upon special vote of the faculty. One hour weekly throughout the year.

5. Honor Course. Candidates must complete all the regular work of the department and must pursue, in addition, a special course in advanced mechanics and physics three hours a week throughout the senior year, and must submit theses.

Open to seniors who have complied with the requirements for special honors.

Chemistry

PROFESSOR ELLERY, MR. SALATHE, AND MR. VOSBURGH

The object of instruction in this department is to develop power of accurate observation and logical reasoning, and habits of careful work. Students who are planning special courses in chemistry, medicine, biology, geology, or other branches of natural science, will find the courses of great value. The laboratory facilities are convenient, the apparatus and chemicals are the best, and the chemical library contains recent books on various branches of the science.

1. General Chemistry. The course includes an exhaustive study of the non-metals and their compounds, together with the fundamental laws and theories of chemistry, a special study of the common metals, and a brief introduction to organic chemistry. Laboratory practice in the fall and winter terms is strictly quantitative, and in the spring term includes simpler methods of qualitative analysis involving the recognition of single metals and acid radicals in solution.

Required of sophomores in the B. E. courses. Two recitations and one laboratory period weekly throughout the year.

1a. General Chemistry. This course is similar to course 1, in that it includes the study of metals and non-metals, theories and laws, but analytical work in the laboratory is limited to recognition of acid radicals in solution.

Required of freshmen in the B. S. course. Elective for juniors and seniors in the A. B. and Ph. B. courses. Two recitations and one laboratory period weekly throughout the year.

1b. General Chemistry. This course differs from courses 1 and 1a in that two laboratory periods weekly are required throughout the year.

Required of students in the one-year pre-medical course. Two recitations and two laboratory periods throughout the year.

2. Chemistry of Engineering Materials. This course covers a more exhaustive study of the metals than course 1, and acquaints the student with some of the applications of chemistry to engi-

neering problems. The laboratory work comprises systematic chemical and physical examination of complex mixtures, particularly of those materials which are of especial interest to engineers.

Required of juniors in the B. E. course, option A. Two recitations and two laboratory periods during the first semester.

2a. Qualitative Analysis. A study of the reactions of bases and acids in solution, a course in blowpipe analysis, a systematic examination of complex solutions of metals and acids, and of complex solids.

Optional for sophomores in the B. S. course. Elective for juniors in the B. S. course who had biology in their sophomore year and for seniors in the A. B. and Ph. B. courses, who have had course 1a. Three laboratory periods weekly throughout the year.

3. Quantitative Analysis. In this course the student becomes familiar with various gravimetric and volumetric methods of analysis.

Elective for juniors and seniors in the B. S. course who have had course 2a. Three laboratory periods weekly throughout the year.

Students who elect quantitative analysis will be expected to elect course 1, general physics.

3a. Technical Analysis. This course comprises the more important commercial and municipal methods of chemical analysis. The work includes the study of various metallurgical processes, analyses of iron and steel, gas, water, cements, milk, foods, etc., and is calculated to give preparation for educational, industrial and municipal positions.

Elective for juniors and seniors in the B. S. course who have had or are pursuing course 3, and who have maintained a grade of at least 80 in courses 1a and 2a. Three laboratory periods weekly throughout the year.

4. Organic Chemistry. This course comprises analysis of organic compounds, the preparation of typical organic substances, and a thorough study of the principles and theories of organic chemistry

In addition to the analysis of organic compounds, students in

this course will have opportunity to make molecular weight determinations by the vapor density method, and the boiling and freezing point method. They will also have opportunity to study the effects of electrolysis on typical organic compounds.

Elective for seniors in the B. S. course who have had course 3. Three laboratory periods weekly throughout the year.

Students who elect organic chemistry will be expected to elect course 1, general biology, if they have not already pursued that course in their junior year.

4a. Organic Preparations. This course is supplementary to course 4, and includes the study of organic compounds which have industrial uses, or whose preparation presents special difficulties or exceptions to usual methods. Among other topics considered are the mixed ethers and the esters, and their use as artificial flavoring and perfume, saponification as applied to soaps, dyestuffs, amino-compounds and nitrogen products generally, with especial reference to the proteids and alkaloids.

Elective for seniors in the B. S. course who have had courses 3 and 3a, who are pursuing course 4, and who have maintained a grade of at least 80 in courses 3 and 3a.

5. Sanitary Chemistry. In the first semester the course includes a limited study of gravimetric and volumetric methods in quantitative analysis. In two other semesters the course covers water analysis, both chemical and bacteriological; analysis of sewage and the effluent of sewage disposal plants; and analysis of the products of garbage disposal plants. Lectures are given during the year on public health methods of the larger cities of the United States.

Required of juniors in the G. E. course, Option C. Four hours weekly throughout the year.

6. Honor Course. Students who have done satisfactory work in courses 1a and 2a are eligible for honors in the department. In addition to the six credit hours of work offered in the junior and senior years, candidates for honors are required to take a course in physical chemistry, read assigned works on general and industrial chemistry, work out some original problem in inorganic or organic chemistry and present a thesis on the work and pass

an oral examination covering the work of the four years in chemistry.

Biology and Geology

PROFESSOR STOLLER AND MR. GOODRICH

1. General Biology. In this course, after an introductory study of cells and tissues, a series of types of plants and animals is studied with reference to structure, function and development. It is intended to make the work a discipline in the method of scientific study and to afford the student a knowledge of the broader facts and principles of biological science in their general philosophical values. Laboratory work, lectures and recitations, counting as a three-hour course.

Optional for sophomores in the B. S. course. Three hours weekly throughout the year.

2. Biology and Geology. This course is intended to afford a general knowledge of these sciences as branches of liberal culture. The treatment is general and philosophical rather than technical but some laboratory work is required and constant use is made of illustrative material. The course includes a consideration of the scientific evidences of organic evolution and the theories of evolution of various authors.

Optional for sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

3. Animal Morphology. This course is adapted for students who wish a somewhat advanced knowledge and training in biology, especially as a preparation for the medical profession. The work is mainly in comparative anatomy and embryology and includes the dissection of several vertebrate types, including a mammal, in detail.

4. Pre-Medical Biology. This course has been arranged to meet the requirement of the medical department of Union University, see page 29. The work consists of laboratory work in anatomy, histology and embryology and of a text-book course in biology, together counting as a four-hour course.

Required of freshmen in the one-year pre-medical course. Four hours weekly throughout the year.

5. Mineralogy and Geology. This course consists largely of laboratory and field work. It begins with the determination of common minerals and rocks. Physiographic and structural geology are studied on the basis of the topographic maps and folios of the United States survey and of the New York state geological survey. Along with the practical work a text-book course in general geology is given.

Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

6. Economic Geology (a). In this course after an introductory study of the principles of structural geology the work is related to the occurrence and distribution in the United States of building stones and materials, mineral ores, coal and other economic products.

Required of juniors in the G. E. course. Two hours weekly during the first semester.

7. Geology.

a. Economic Geology (b). Laboratory work on minerals and mineral products of economic importance; study of geologic maps and bulletins dealing with distribution and occurrence of economic products; text-book study. (First semester).

b. Structural and Historical Geology. Readings and discussions of geological reports, especially of New York State geology; field work in the identification of geological formations; collection and determination of fossils. (Second semester).

Elective for seniors in the A. B., Ph. B., and B. S. courses. Three hours weekly throughout the year.

8. Honor Course. Glacial Geology. A detailed study of the the deposits of the Pleistocene period as occurring in the region of the lower Mohawk valley and the interpretation of the conditions under which they were laid down. Also a general study of the glacial period of geological history. This course includes at least 60 hours of field work.

Open to seniors who have complied with the requirements for special honors and have had course 5 and are taking course 7.

Physiology and Physical Training

DR. MCCOMBER

Physical training and the study of human anatomy, physiology, and hygiene are required in all courses. The work consists of recitations and lectures, demonstrated by means of the microscope, the manikin and the human skeleton. An attempt is made to give a practical course covering the essential facts of the subject with the idea of arousing in every student a genuine self interest, of developing a wholesome self respect without overwhelming him with the mass of details that must be considered in a close study of anatomy.

The course in hygiene is designed to acquaint the student with practical laws concerning the preservation of health and to impress upon his mind the dependence of health upon the consistent observance of such laws. Lectures on first aid to the injured, bacteriology, contagious and infectious diseases and social purity form a part of the course.

It is the aim of the department to give the student such a training in the methods of physical education that he may have a comprehensive knowledge of the subject, and to secure health, vigor and such harmonious development of the body as will fit it to resist disease, and prepare it for efficient service, both now and later in life.

Work in the gymnasium is required of freshmen only, but the organization of voluntary classes makes it possible for all to secure the advantages of systematic exercise. The course in the gymnasium is so arranged as to give a knowledge of the different kinds of apparatus pertaining to physical training. Commencing with light work, consisting of free gymnastics, club, dumb-bell and wand exercises, the course leads through a graded series, involving heavier work as the student becomes fitted for it.

Swimming is a regular part of the course in gymnastics and all freshmen are expected to acquire a reasonable proficiency in it. Life saving under the auspices of the American Red Cross is taught.

Freshmen are required to pass an examination in gymnastics, credit being based upon actual proficiency in the various exercises as indicated by such examination. During the spring and fall students may elect field sports.

A physical examination of new students is made at the beginning of the year and corrective exercises are prescribed for the remedy of physical defects. Charts of the physical measurements showing the comparison of the individual with the normal development and hand books containing much valuable hygienic data are furnished upon payment of a small fee. All candidates for college teams are required to pass a satisfactory physical examination before they are allowed to compete in athletic contests.

It is the policy of the department to influence the entire student body to take an active part in athletic sports and gymnastics and not to cater to the exceptional athlete to the exclusion of those who are physically less perfectly equipped.

1. Physiology and Hygiene.

Required of freshmen in the A. B., Ph. B., B. S., and B. E. courses. Two periods weekly throughout the year.

2. Physical Training.

Required of all freshmen. Two periods weekly throughout the year.

Special Lectures

It is the policy of the college to provide its students with the advantages of frequent lectures by specialists in the various departments of knowledge.

In endowing the Ichabod Spencer Professorship in Philosophy, Mrs. Katherine Spencer Leavitt set aside the sum of \$25,000 to establish a lectureship in memory of her father, the Reverend Ichabod Spencer, D.D., of the class of 1822, to be known as the Ichabod Spencer Lectureship in Psychology.

These lectures are given by distinguished scholars in this department, each year's course being published in book form.

Library

The library occupies Nott Memorial Hall. It contains forty thousand volumes, and includes the engineering and scientific library of the late Professor Gillespie, the collection of mathematical works made by the late John Patterson, of Albany; the library of the late Hon. Henry J. Cullen, of the class of 1860, and the library of ancient and classical languages and literatures of the late Professor Tayler Lewis. The income from a bequest of five thousand dollars left by the late Lemon Thomson, Esq., of Albany, of the class of 1850, is devoted to the purchase of books on American subjects, especially history and political science. An alcove, known as the Thomson Alcove, is reserved for these books. By the will of the late Rev. Oscar Blakeslee Hitchcock, of the class of 1852, a bequest of upwards of thirty thousand dollars was left to the college for the purchase of books, manuscripts, etc. A most important accession is the Croes Engineering Library, the gift of Mr. Edgar Beach Van Winkle of the class of 1860. This section of the library is in the General Engineering Building for the use of the engineering department of the college. The library is classified according to the Dewey decimal system and a dictionary card catalogue, on the Dewey plan, is now being prepared.

One hundred and fifteen periodicals and the transactions of many learned societies are received.

Library Rules

Hours: 8-1; 2-6; 7:30-9 from Monday to Friday. 8-1; 7:30-9 on Saturday.

The library will be closed on Sundays and legal holidays.

The library will be open during vacation at hours to be announced.

Loan of books: Reference, Cullen and valuable books are not to be loaned.

Reserved books may be loaned over night, i. e., from 9 p. m. to 8 a. m. There will be a fine of \$1.00 per day or part of a day for each reserved book overdue.

Periodicals are regarded as reference books.

All other books may be loaned, not more than two at a time, for a period of two weeks, and may be once renewed, unless called for. A fine of ten cents per day will be charged for all books overdue, and all library privileges will be withdrawn until the book is returned and the fine paid.

The Natural History Museum

PROFESSOR STOLLER, CURATOR

The Wheatley collection of minerals, presented to the college in 1858, by E. C. Delavan, Esq., contains 4,000 specimens, many of which represent the more valuable forms. This collection has recently been carefully inspected by Dr. D. S. Martin of New York city. All of the specimens have been re-identified and the entire collection has been re-arranged and placed in order for exhibition and for study.

In geology there is a general collection of rocks and minerals, and a considerable collection of the paleozoic rocks and fossils of the New York formations.

In zoology the collection of mounted birds numbers 311 specimens, representing 161 species of the bird fauna of the eastern United States. These have recently been carefully inspected, and re-labelled. Fishes, amphibia and reptiles, especially of the local fauna, are represented by specimens in alcohol. In the department of invertebrates the collections of marine animals made by Dr. Harrison E. Webster are extensive, including sponges, corals, worms, crustacea and mollusks, the total number of species represented being over 5,000. The Wheatley collection of shells, presented by E. C. Delavan, Esq., consists of 8,000 specimens.

The botanical collections include a nearly complete set of local flowering plants, the work of Professor Jonathan Pearson. To this there has since been added a complete set of the ferns and fern allies of Schenectady county. The herbarium also includes a considerable number of foreign plants, including representative collections from Germany, Spain, Asia Minor and England, as well as some specimens from Iceland, Norway, France and Switzerland. They have been sorted and distributed in a single series

following the latest accepted sequence, that of Engler and Prantl's *Natürliche Pflanzenfamilien*, making the entire collection of some 8,000 or 10,000 specimens readily accessible for reference and study.

The museum is open to the public on Wednesday afternoon and Saturday morning. Visitors may be admitted at other times by making application to the college librarian.

The Literary Societies

The Philomathean Society, founded in 1793, about two years prior to the founding of the college, and the Adelpic Society, founded in 1796, invite to membership all students specially interested in debating. The societies hold frequent meetings during the autumn and winter months for the discussion of current, social and political questions. A joint debate is held in December in competition for the Allison-Foote prizes, page 139.

Religious Life

Religious life among the students is cared for through the agency of the Union College Christian Association. This work is under the special care of a secretary who devotes his time to the religious interests of the students. Vesper services are held every Sunday afternoon throughout the year and eminent speakers are secured to conduct these services.

CURRICULA OF ACADEMIC COURSES

The numeral after a subject refers to the course as described in the departmental statement; the number in parenthesis refers to the page where the statement is given. The hours show the time given the subject each week in the class room. All subjects are continued throughout the year.

Course A leading to Degree of A.B.

The full entrance requirement in Greek is required for admission to this course.

Freshman Year

Greek 1.....	(44).....	5 hours
Latin 1.....	(46).....	4 hours
French 1	(51).....	5 hours
Mathematics 1	(63).....	4 hours
Physiology and Hygiene 1.....	(74).....	2 hours

Total 18 hours

One credit hour is required in Gymnastics

Sophomore Year

Greek 2 and History.....	(45).....	4 hours
Latin 2.....	(46).....	3 hours
English 3.....	(54).....	3 hours
German 2.....	(49).....	5 hours
Mathematics 3.....	(64).....	3 hours
or		
Biology and Geology 2.....	(71).....	3 hours
Rhetoric 10.....	(56).....	1 hour

Total 19 hours

Junior Year

Rhetoric 11.....	(56).....	1 hour
Electives.....	(85).....	15 hours

Total 16 hours

Senior Year

Rhetoric 12.....	(57).....	1 hour
Electives.....	(86).....	15 hours

Total 16 hours

Course B leading to Degree of A.B.

No Greek is required for admission to this course

Freshman Year

Greek 1a.....	(44).....	5 hours
Latin 1.....	(46).....	4 hours
German 1a.....	(48).....	3 hours
or		
French 1a.....	(51).....	3 hours
Mathematics 1.....	(63).....	4 hours
Physiology and Hygiene 1.....	(74).....	2 hours
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		Total 18 hours

One credit hour is required in Gymnastics

Sophomore Year

Greek 2a and History.....	(44).....	4 hours
Latin 2.....	(46).....	3 hours
English 3.....	(54).....	3 hours
German 2.....	(49).....	5 hours
or		
French 2.....	(52).....	5 hours
Mathematics 3.....	(64).....	3 hours
or		
Biology and Geology 2.....	(71).....	3 hours
Rhetoric 10.....	(56).....	1 hour
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		Total 19 hours

Junior Year

Greek.....	(44).....	3 hours
Rhetoric 11.....	(56).....	1 hour
Electives.....	(85).....	12 hours
		<hr/>
		Total 16 hours

Senior Year

Greek.....	(44).....	3 hours
Rhetoric 12.....	(57).....	1 hour
Electives.....	(86).....	12 hours
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		Total 16 hours

Course leading to Degree of Ph.B.**Freshman Year**

Latin 1.....	(46).....	4 hours
German 1b.....	(49).....	5 hours
or		
French 1b.....	(52).....	5 hours

English 1	(54).....	3 hours
Mathematics 1	(63).....	4 hours
Physiology and Hygiene 1	(74).....	2 hours

Total 18 hours

One credit hour is required in Gymnastics

Sophomore Year

Latin 2	(46).....	3 hours
German 2	(49).....	5 hours
or		
French 2	(52).....	5 hours
English 3	(54).....	3 hours
History 1	(57).....	3 hours
Mathematics 3	(64).....	3 hours

or		
Biology and Geology 2	(71).....	3 hours
Rhetoric 10	(56).....	1 hour

Total 18 hours

Junior Year

Rhetoric 11	(56).....	1 hour
Electives	(85).....	15 hours

Total 16 hours

Senior Year

Rhetoric 12	(57).....	1 hour
Electives	(86).....	15 hours

Total 16 hours

Course leading to Degree of B.S.

Freshman Year

German 1b	(49).....	5 hours
or		
French 1b	(52).....	5 hours
English 1	(54).....	3 hours
Mathematics 2	(64).....	5 hours
Chemistry 1a	(68).....	3 hours
Physiology and Hygiene 1	(74).....	2 hours

Total 18 hours

One credit hour is required in Gymnastics

Students who offer Latin for entrance take Latin 1 in place of German 1b or French 1b.

Sophomore Year

German 2	(49)	5 hours
or		
French 2	(52)	5 hours
English 3	(54)	3 hours
History 1	(57)	3 hours
Mathematics 4	(64)	3 hours
Chemistry 2a	(69)	3 hours
or		
Biology 1	(71)	3 hours
Rhetoric 10	(56)	1 hour
		<u>Total 18 hours</u>

Junior Year

Rhetoric 11	(56)	1 hour
Electives	(85)	15 hours
		<u>Total 16 hours</u>

Senior Year

Rhetoric 12	(57)	1 hour
Electives	(86)	15 hours
		<u>Total 16 hours</u>

Pre-Medical Course

This course is offered to meet the requirements for admission to the Medical Department of Union University in accordance with recommendations of the American Medical Association.

Physics 1a	(66)	4 hours
Biology 4	(71)	4 hours
Chemistry 1b	(68)	4 hours
German 1b	(49)	5 hours
or		
French 1b	(52)	5 hours
		<u>Total 17 hours</u>

One credit hour is required in Gymnastics

SCHEDULE OF REQUIRED STUDIES IN THE ACADEMIC COURSES

A. B. Course, A

Freshman Year

Greek, 5 hours.....	M., T., W., Th., S., 9-10
Latin, 4 hours.....	M., W., F., S., 11-12
French, 3 hours.....	T., Th., S., 10-11
Mathematics, 4 hours.....	M., T., Th., F., 1:30-2:30
Physiology and Hygiene, 2 hours.....	T., Th., 8-9

Sophomore Year

Greek and History, 4 hours.....	M., T., Th., S., 10-11
Latin, 3 hours.....	M., W., F., 9-10
English, 3 hours.....	T., Th., S., 8-9
German or French, 5 hours.....	T., W., Th., F., S., 11-12
Mathematics, 3 hours.....	M., W., F., 1:30-2:30
or	
Biology and Geology, 3 hours.....	W., F., 1:30-2:30; lab M., 1:30-3:30
Rhetoric, 1 hour.....	T., 1:30-2:30 or 2:30-3:30

Junior Year

Rhetoric, 1 hour.....	S., 10-11
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Senior Year

Rhetoric, 1 hour.....	F., 3:30-4:30
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A. B. Course, B

Freshman Year

Greek, 5 hours.....	M., T., W., Th., S., 9-10
Latin, 4 hours.....	M., W., F., S., 11-12
German, 3 hours.....	M., W., F., 10-11
or	
French, 3 hours.....	T., Th., S., 10-11
Mathematics, 4 hours.....	M., T., Th., F., 1:30-2:30
Physiology and Hygiene, 2 hours.....	T., Th., 8-9

Sophomore Year

Greek and History, 4 hours.....	M., T., Th., S., 10-11
Latin, 3 hours.....	M., W., F., 9-10
English, 3 hours.....	T., Th., S., 8-9
German or French, 5 hours.....	T., W., Th., F., S., 11-12

Mathematics, 3 hours.....M., W., F., 1:30-2:30
 or
 Biology and Geology, 3 hours. W., F., 1:30-2:30; lab M., 1:30-3:30
 Rhetoric, 1 hour.....T., 1:30-2:30 or 2:30-3:30

Junior Year

To be scheduled in 1916-17.

Senior Year

To be scheduled in 1917-18.

Ph. B. Course

Freshman Year

Latin, 4 hours.....M., W., F., S., 11-12
 German or French, 5 hours.....M., T., W., F., S., 9-10
 English, 3 hours.....M., W., F., 8-9
 Mathematics, 4 hours.....M., T., Th., F., 1:30-2:30
 Physiology and Hygiene, 2 hours.....T., Th., 8-9

Sophomore Year

Latin, 3 hours.....M., W., F., 9-10
 German or French, 5 hours.....T., W., Th., F., S., 11-12
 English, 3 hours.....T., Th., S., 8-9
 History, 3 hours.....T., Th., S., or M., W., F., 10-11
 Mathematics, 3 hours.....M., W., F., 1:30-2:30
 or
 Biology and Geology, 3 hours. W., F., 1:30-2:30; lab M., 1:30-3:30
 Rhetoric, 1 hour.....T., 1:30-2:30 or 2:30-3:30

Junior Year

Rhetoric, 1 hour.....S., 10-11

Senior Year

Rhetoric, 1 hour.....F., 3:30-4:30

B. S. Course

Freshman Year

German or French, 5 hours.....M., T., W., F., S., 9-10
 or
 Latin, 4 hours.....M., W., F., S., 11-12
 English, 3 hours.....M., W., F., 8-9
 Mathematics, 5 hours.....M., W., Th., F., S., 10-11
 Chemistry, 3 hours...T., Th., 11-12; lab T., Th., or F., 1:30-3:30
 Physiology and Hygiene.....T., Th., 8-9

SCHEDULE OF JUNIOR AND SENIOR ELECTIVES

A total of fifteen hours is required.

Each student is required to choose two electives to be continued for two years, one of which must be the continuation of a subject previously pursued in college.

The head of a department may direct the choice of electives in other departments, for honor students, to the number of six hours in each year.

Subjects that conflict have been placed in the same group.

Junior Groups

Group I

French 3, 3 hours.....	M., W., F., 8-9
French 3a, 3 hours.....	M., W., F., 8-9
Greek B, 3 hours.....	M., W., F., 8-9
American History, 3 hours.....	M., W., F., 8-9
Mineralogy and Geology, 3 hours.....	M., W., F., 8-10

Group II

English 4, 3 hours.....	M., W., F., 9-10
Calculus, 3 hours.....	M., W., F., 9-10
Mineralogy and Geology, 3 hours.....	M., W., F., 8-10

Group III

Economics 1, 3 hours.....	M., W., F., 10-11
Differential Equations, 3 hours.....	M., W., F., 10-11

Group IV

European History, 3 hours.....	M., W., F., 11-12
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Group V

German 3, 3 hours.....	T., Th., S., 8-9
German 3a, 3 hours.....	T., Th., S., 8-9
Greek A, 3 hours.....	T., Th., S., 8-9

Group VI

Latin, 3 hours.....	T., Th., S., 9-10
Argumentation, 3 hours.....	T., Th., S., 9-10

Group VII

Physics 1, 4 hours.....	T., Th., 10-11; lab M., W., 1:30-3:30 or 3:30-5:30
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Group VI

English 9, 3 hours.....	T., Th., S., 9-10
Ad. Psychology, Ad. Ethics and Evolution of Religion, 3 hours..	T., Th., S., 9-10
Mathematics 8, 3 hours.....	T., Th., S., 9-10

Group VII

Latin 6, 3 hours.....	T., Th., S., 10-11
Sociology, 3 hours.....	T., Th., S., 10-11
Economic, Historical, and Structural Geology, 3 hours.....	T., Th., S., 10-12

Group VIII

Greek B, 3 hours.....	T., Th., S., 11-12
Advanced Argumentation, 3 hours.....	T., Th., S., 11-12
Mathematical Physics, 3 hours.....	T., Th., S., 11-12
Economic, Historical, and Structural Geology, 3 hours.....	T., Th., S., 10-12

Group IX

Greek 5, 3 hours.....	M., W., F., 1:30-2:30
Qualitative Analysis, 3 hours.....	M., W., 1:30-4:30
Organic Chemistry, 3 hours.....	M., W., 1:30-4:30
Physics 2, 3 hours.....	T., Th., 1:30-3:30; F., 1:30-2:30

Group X

Spanish, 3 hours.....	M., W., F., 2:30-3:30
History of Education, 3 hours.....	M., W., F., 2:30-3:30
Qualitative Analysis, 3 hours.....	M., W., F., 1:30-4:30
Organic Chemistry, 3 hours.....	M., W., 1:30-4:30

Group XI

Animal Morphology, 3 hours.....	T., Th., 1:30-4:30
Quantitative Analysis, 3 hours.....	T., Th., 1:30-4:30
Rhetoric 15, 2 hours.....	Th., 2:30-4:30
Physics 2, 3 hours.....	T., Th., 1:30-3:30; F., 1:30-2:30

DEPARTMENTS OF INSTRUCTION

TECHNICAL

General Engineering

- OLIN H. LANDRETH, A. M., C. E., Sc. D.
 Professor of Civil Engineering
- GEORGE L. LYON, B. S., C. E.
 Assistant Professor of Civil Engineering
- WARREN C. TAYLOR, S. B.
 Assistant Professor of Civil Engineering
- JOHN A. C. CALLAN, M. C. E., M. A.
 Instructor in Engineering Drawing
- MORTIMER F. SAYRE, E. M., A. M.
 Instructor in Engineering

Electrical Engineering

- ERNST J. BERG, M. E., Sc. D.
 Professor of Electrical Engineering
- CHARLES P. STEINMETZ, A. M., Ph. D.
 Professor of Electro Physics
- WALTER L. UPSON, M. E., M. S., M. E. E.
 Associate Professor of Electrical Engineering
- MORLAND KING, M. E. E.
 Associate Professor of Electrical Engineering
- JOHN N. VEDDER, A. M.
 Assistant Professor of Thermodynamics
- EVERETT S. LEE, B. S.
 Instructor in Electrical Engineering

Historical. Before the beginning of technical education at Union College unusual attention was given to instruction in science. The first full professorship in natural science in an American college was founded at Union and it is a matter of special scientific interest that Prof. F. R. Hassler was called from this chair in 1811 to establish the United States Coast Survey.

The civil engineering department of Union College was one of the oldest technical schools in the country. Founded in 1845 with Prof. William M. Gillespie at its head, it at once took high rank, and for many years was one of the few engineering schools

in America. From the first it was the evident policy of the department to adapt the thorough training of L'Ecole des Ponts et Chaussées, of Paris, France, where Prof. Gillespie had finished his technical education, to the demands of professional practice in a vigorous new country, where resources and opportunities were abundant, and where capital and professional precedent were wanting. From the characteristic tendencies impressed on the department at its foundation it has never departed, although it has endeavored to keep pace with the development in American technical education and with the increased demands on professional training. For many years civil engineering only was taught; then, as the principles of modern sanitary science came to be better understood and the possibilities of their further development and their utilization as life-saving agencies were discerned, a course in sanitary engineering was established; and more recently a course in electrical engineering was added.

From the beginning the teaching of engineering at Union College has been directed to broad, fundamental training rather than to narrow specialization and during recent years, since its advanced entrance requirements have made room in the course, increased time and attention have been given to culture studies and to a larger proportion of academic training.

Local Advantages. Schenectady is a peculiarly favorable location for an engineering school. The city is on the Mohawk River, and is intersected by several steam railroads, a number of inter-urban trolley lines and the Erie Canal, furnishing many bridges and other engineering works. At Schenectady are also located the works of the General Electric Company and of the American Locomotive Company, each an extensive and leading industry in its respective line. Among other interesting engineering features may be mentioned the city grade-crossings improvement completed at a cost of a million dollars, and the city water-works, which contain in their outfit a system of ground-water wells and a set of electrically-driven multiple-stage centrifugal pumps, of twenty million gallons daily capacity. The neighboring cities of Albany, Troy and Cohoes, as well as the surrounding territory, offers numerous examples of good engineering

and many features of value as aids in engineering training. Among these may be mentioned the scientific departments of the state government at Albany, comprising the state engineer's department, which includes also the new barge canal, the good roads division and the bureau for testing materials; the headquarters of the state water supply commission, which includes also the state river improvement work; the headquarters of the Public Service Commission for district No. 2; the state library, which is well supplied with technical and engineering works; the Albany city water filtration plant; at Troy, the Burden iron works and the Gurley engineering instrument manufactory; at Watervliet, the United States arsenal and gun factory; the water power developments and electric power transmission plants at Mechanicville, Spier Falls, Schaghticoke and Johnsonville; the hydraulic cement works at Glens Falls and at Howe's Cave; and the modern sewage disposal systems at Saratoga Springs, Ballston Spa and Scotia. The new barge canal will pass the Cohoes falls by a flight of locks and will pass Schenectady by a system of locks and dams, both permanent and movable, now under construction, which will canalize the Mohawk River, calling for extensive and interesting engineering operations. All these sources of aid are utilized in the work of instruction.

Courses of Study

Undergraduate Courses. Two undergraduate courses of study in engineering are offered, each extending through four years.

1) A course in general engineering, intended to give the basis of a broad engineering education, including the fundamental principles underlying special branches of the profession, and offering three options: (a) Option A, which is devoted to the more purely technical civil engineering subjects; (b) Option B, which affords training along executive and administrative lines; and (c) Option C, which lays special emphasis on sanitary engineering subjects.

2) A course in electrical engineering in which the last two years are devoted to essentially mechanical and electrical engineering subjects.

These two courses are identical during the first two years. The degree of Bachelor of Engineering is given for the successful completion of either course.

Graduate Courses. In addition to the above undergraduate courses in engineering, the following graduate courses and degrees are offered:

The degrees of Master of Civil Engineering (M. C. E.) and of Master of Science in Electrical Engineering (M. S. in E. E.) are given on the satisfactory completion of one-year graduate courses of resident study in civil engineering and in electrical engineering, respectively. The degree of Doctor of Philosophy (Ph. D.) is given to candidates who have received the master's degree, on the completion of an additional course of two years of graduate study in electrical science. See page 138.

The non-resident degree of Civil Engineer (C. E.) and Electrical Engineer (E. E.) may be conferred upon graduates of Union College under conditions explained on page 139.

Studies of the Two Undergraduate Courses

Especially in the first two years many of the studies of the engineering course are the same as those given in the academic courses. These are described under the departmental statements on pages 44-74. There follows an outline of the technical studies which are common to the four-year courses given in general and electrical engineering. The studies which are peculiar to each are outlined in the statement of the separate departments.

Studies required in the first two years of the other courses are:

Mathematics	Page 63
Physics	Page 65
Chemistry	Page 68
English	Page 54
Modern Languages	Page 48
Hygiene	Page 73

Any of the other studies of the academic courses of the college may be taken by engineering students without extra charge, on approval of the faculty.

The following technical subjects are included in each of the

two engineering courses and the instruction is given by the general engineering department.

G.E.1. Engineering Drawing. This course commences with freehand drawing, which includes the subject of form, proportion and perspective; light and shade; the æsthetics of decorative and applied design; drawing from models and thorough practice in lettering. This work is followed by a course in mechanical drawing, which takes up the study of projections of solids in four quadrants; the developments of working drawings; isometric and oblique projections; care and use of drawing instruments; mechanical lettering; and blue printing.

Required of all engineering freshmen. One lecture and two drawing periods weekly during the first semester and one lecture and one drawing period weekly during the second semester.

G.E.2. Descriptive Geometry. This course presupposes G.E.1. Original problems relating to the stationary and revolved positions of points, lines, and planes are given in addition to the study of the first seventeen problems of Church's Descriptive Geometry. A study is also made of problems relating to tangent planes; the intersections and developments of plane and curved surfaces; shades and shadows; and linear perspective. Use is made of the Schroeder models, the Olivier models, and the models of the Paris Polytechnical School. The application of the subject to practical problems is emphasized.

Required of all engineering sophomores. Two recitation and two drawing periods weekly during the second semester.

G.E.3. Surveying. The first half of this course is devoted to a study of the mensuration of lines, surfaces, and solids. This is followed by a careful study of the elementary principles of surveying. The student is taught the use, manipulation and adjustment of the engineer's transit and level. Field and plotting work accompany the class room study.

Required of all engineering freshmen. Two credit hours weekly during the second semester.

G.E.4. Plane Surveying. This course is a continuation of G.E.3, and consists of a study of the methods of plane survey-

ing. Field work is conducted along thoroughly practical lines and a complete traverse, with its details, is worked out by each student, together with other important problems, including running a profile, and establishing grades.

Required of all engineering sophomores. One recitation and one field or drawing period weekly during the first semester.

G.E.30 and 31. Engineering Lectures. Lectures are given on topics pertaining to the training and qualifications of an engineer and to the engineering profession. Students are assigned parallel readings bearing on these topics.

Required, G.E.30, of all engineering freshmen, one hour weekly during the first semester; G.E.31, of all engineering sophomores, one hour weekly during the second semester.

G.E.32. Summer Vacation Work. All students in the engineering courses during their summer vacation following the freshman, sophomore and junior years are required to prepare a report on their summer work. This report must be done under one of the following options:

- a) Actual participation in engineering work.
- b) Investigation by research and reading.
- c) Critical examination of some engineering project.
- d) Critical reading and abstract of a stated amount from an approved list of books. The details of these options are announced by the department.

The work is due at the opening of the first semester.

G.E.33. Commencement Term Work. In addition to the weekly field and laboratory exercises throughout the year, all freshman and sophomore engineering students, and juniors in the general engineering course, are given an uninterrupted fifteen days' course in field-practice and laboratory work supplementary to the studies in which such practice is desirable. The course begins on the day (Thursday) following Commencement and continues through that and the two following weeks. The work is so selected and arranged as not only to supplement the studies of the year, but also to give instruction and practice in the organization, operation and direction of work conducted by engineering parties. This work receives three hours' credit in the first semester grades.

General Engineering Department

Three Optional Courses. In the four-year general engineering courses three optional courses are offered, any one of which may be selected by general engineering students at the beginning of the junior year, and each of which extends through the junior and senior years.

The first of these courses, designated as Option A, offers a broad, fundamental, general engineering training such as a thoroughly trained engineer should have before specializing in any of the branches of the profession.

The second course, designated as Option B, while in the main identical with the former, differs from it by omitting some of the more technical subjects, such as sewerage, geodesy and railroad construction, and by substituting therefor, municipal government and international law, the principles of finance and financial operations, the principles of business management and accounting, and additional work in history and in engineering law and procedure. The object of this course is to offer to engineering students an opportunity to qualify themselves for engineering positions of an executive or administrative character.

The third course, designated as option C, offers work in sanitary engineering subjects. While in the main it follows Option A, it includes sanitation, sanitary analysis, heating and ventilation, and additional work in chemistry, in substitution for some of the more technical civil engineering subjects of Option A.

List of Studies

The studies given by the general engineering department during the third and fourth years are described below in detail. The subjects taught during the first two years are given on the preceding pages.

Studies given by other departments during the third and fourth years are:

Rhetoric	Page 65
History	Page 57
Chemistry	Page 68
Economic Geology	Page 72

Economics	Page 61
International Law	Page 59
Municipal Government	Page 63
Sanitary Analysis	Page 70
Mathematics	Page 99

The engineering subjects not previously described are:

G.E.5. Topographical Surveying. The class room work considers various kinds of surveying, including land, city, mining and hydrographical surveying. Field practice in topographical methods, stadia traversing, and triangulation supplement the recitation work. A topographical map is plotted during the semester.

Required of all general engineering juniors. One recitation and one field period weekly during the first semester.

G.E.6. Route Surveying and Highways.

a) Route Surveying. This course is devoted to the elements of reconnaissance and location including in detail, railroad curves, simple, compound, and reversed; switches and frogs, turnouts; easements; and earthwork. Field problems and office computations accompany the recitation work.

b) Highways. This includes a study of economic location; the details of the various types and methods of highway construction; the materials and the maintenance of highways. Street location and maintenance, paving methods, and paving materials with special reference to their sanitary aspects are also considered.

Required of general engineering juniors. Four hours weekly during the second semester.

G.E.8. Geodesy. Under this head is given a course which virtually includes four subjects. The work starts with a short study of spherical trigonometry, which prepares for work in descriptive and mathematical astronomy. This latter topic affords the student a general knowledge of astronomy. The fundamental principles of the method of least squares and their application to the solution of astronomical, physical and engineering problems are next considered. The general subject of geodesy is then taken up, including the principles of adjustment of error,

and their use in establishing empirical formulas; a discussion of the figure of the earth; triangulation; base lines; and precise leveling. The work is accompanied by field periods and includes the determination of time, latitude, and azimuth.

Required of general engineering juniors, Option A. Four hours weekly during the second semester.

G.E.9. Applied Mechanics. This course comprises a study of the principles of kinematics; the dynamics of particles and rigid bodies, including the dynamics of rotation, friction and lubrication; and the general principles and applications of statics.

Required of general engineering juniors. Four hours weekly during the first semester.

G.E.10. Mechanics of Materials. This comprises a study in the strength of materials including stresses and strains of all kinds of bodies subjected to various loadings. The course also takes up the production, preparation and physical properties of engineering materials. In conjunction with this work is a laboratory exercise which comprises tests of the physical properties of brick, wood, steel, iron, stone, and concrete, and also work in the cement laboratory in the preparation and properties of cement, mortar and concrete.

Required of all engineering juniors. Three recitation hours and one laboratory period weekly during the second semester.

G.E.11. Engineering Stresses.

Required of general engineering seniors. Five hours weekly during the first semester.

G.E.12. Engineering Design.

An important feature of these courses is the work in articulate structures, foundations, masonry construction, and water-power and other hydraulic development. The exercises in this line of work are, as far as possible, chosen from professional practice, and the student is expected to carry out, from assigned data and conditions, the preliminary study, determinations of stresses, types, dimensions and details, and to turn in the results in the form of working drawings, diagrams and memoirs. The course is preceded by a series of lectures on the principles and

economics of designing. The department possess a large collection of drawings and photographs of representative engineering structures from which students can form correct ideas of modern practice in the designing of details and in the methods followed on works of this class. The courses are also supplemented by actual design in the drafting room, including a steel mill building and a plate girder bridge.

Required of general engineering seniors. Five hours weekly during the second semester.

G.E.13. Thermodynamics. This course consist of lecture, recitation and exercise work in the principles of thermodynamics, including the thermal properties of gases and vapors, saturated and superheated steam, the steam indicator and the steam engine.

Required of general engineering juniors. Two hours weekly during the second semester.

G.E.14. Hydraulics. This course covers the principles of hydrostatic and hydrodynamic pressure, flow of water over weirs, through orifices, through pipes and open channels. The work in the class room is supplemented by laboratory exercises.

Required of all general engineering juniors. Two recitation and one laboratory period weekly during the first semester.

G.E.15. Electrical Machines. A course in the fundamental principles and use of electrical generators, motors, transformers, transmission and other electrical machines. This course is given by the electrical engineering department.

Required of all general engineering juniors. Two hours weekly during the second semester.

G.E.16. Water and Sewage. This includes a study of rainfall, run-off, and storage of water, in relation to both water power and potable supplies. The work in sewerage considers the design and construction of sewage systems, disposal plants with the underlying principles involved.

Required of general engineering seniors in Options A and C. Five hours weekly during the second semester.

G.E.17. Railroad Construction. In this course a complete investigation is made of the economic location and construction of

railroads, railroad equipment, train resistance, maintenance of way, and buildings and yards. Field and drawing periods accompany the class room work.

Required of general engineering seniors in Option A. Two recitation and one field or drawing period weekly during the first semester.

G.E.18. Motors and Motive Power. Following the work in thermodynamics and hydraulics of the junior year an outline course in motors and motive power is given in the first semester of the senior year, comprising a study of the sources of demand and supply of power, steam-boilers, steam-engines, steam turbines, water-wheels and turbines, gas-engines, electric motors and transmission of power by shafting, belting, rope-driving, compressed air and electricity. The new laboratory affords opportunity for efficiency tests of hydraulic and other forms of motors.

Required of general engineering seniors. Four hours weekly during the first semester of senior year.

G.E.19. Outlines of Architecture. This course is a study of the historical development of architecture as exemplified in the different orders and styles.

Required of general engineering seniors. One hour weekly during the first semester.

G.E.20. Building Construction. This course comprises a study of the masonry construction of buildings including the discussion of the various materials and their preparation; the classes and methods of framing, in steel, wood and concrete; and a short study of the principles of reinforced concrete as applied to building construction.

Required of all general engineering seniors. Three hours weekly during the second semester.

G.E.21. Heating, Ventilation, and Sanitation.

a) Heating and Ventilation. This course treats the principles of heating and ventilation with a discussion of the various systems in use. Actual designing problems are made an important part of the work.

b) Sanitation. This course treats of the sanitary conditions

of buildings including drainage and plumbing, and also discusses sanitary codes and laws.

Required of general engineering seniors in Option C. Three hours weekly during the first semester.

G.E.23. Sanitary Analysis. This is a laboratory course given by the department of chemistry in the analyses of air, gases, water and sewage.

Required of general engineering seniors in Option C. Three periods weekly during the second semester.

G.E.24. Engineering Law. This course includes a treatment of the fundamental development of law from the Roman and English common law, the function of the state in general, and the American system of federal and state jurisdiction in particular. Some attention is given to the fundamental bases of the law of contracts, agency, property rights and corporations; and to the principles of finance and financial operations.

Required of general engineering seniors in Options A and C. Three hours weekly throughout the year.

G.E.25. Engineering Law. This course includes a treatment of the fundamental development of law, the function of the state in general and the American system of federal and state jurisdiction in particular. Attention is given to the fundamental bases of laws, contracts, agency, property rights, and corporation and municipal laws. The subjects are treated more extensively than in Option A, G.E.24.

Required of general engineering juniors in Option B. Three hours weekly during the first semester and two hours weekly during the second semester.

Principles of Finance, Business, Accounting. General engineering students who elect Option B are given instruction in the principles of finance and financial operations, the principles of business and industrial organization and administration, and the principles of accounting and of cost-keeping. The following courses are offered.

G.E.26. Principles of Finance.

Required of general engineering seniors in Option B. Three hours weekly during the first semester.

G.E.27. Principles of Administration.

Required of general engineering seniors in Option B. Two hours weekly during the second semester.

G.E.34. Thesis. Each candidate for graduation is required to present on or before the third Wednesday in May of his graduation year a satisfactory thesis on a subject that has been approved by the professors of civil engineering or of electrical engineering. This thesis must be original in its character and may be either a design for some engineering structure or plant, process or operation, or an independent investigation of some principle, problem or matter of engineering importance. Reviews or copies of existing structures, plants or processes, unless of special educational value or involving original investigation, will not be approved as subjects. The thesis is to be in a form prescribed at the time of approval of the subject, and is to be bound for deposit in the library of the engineering department, and must be presented in this shape on or before the stipulated date. The subjects, with outlines of the proposed treatment, must be submitted in time for final approval not later than November 1st preceding graduation, and the work on the theses must be presented for inspection and criticism of the professor in charge of the department at intervals during progress

Equipment

General Engineering Building. The new engineering building, the donation of Mr. Andrew Carnegie for the general engineering department, erected at a cost of \$100,000, is a handsome structure of modern design, built of gray and buff pressed brick with gray stone trimmings.

The building is of fireproof construction throughout, the only wood used being in the doors, windows, and floor surface. It covers an area of 67 x 137 ft. and is three stories in height, with a basement above the ground level, making it practically four stories.

The entire east end of the basement, 50 x 62 ft. in area, is used as a hydraulic and mechanical laboratory. It is equipped with a steel tank 5 ft. in diameter and 52 ft. high, extending to the roof,

with a tight cover so that it can be used as either a gravity or a pressure tank. The base of the tank is provided with connections for standard orifices of various sizes and shapes. Connections will also be provided so that turbines and other forms of water motors can be driven by water from the tank under different heads. This room also contains a concrete canal 5 ft. deep, 9 ft. wide and about 20 ft. long, which will be extended out of doors to a total length of 100 ft. It will be arranged for the insertion of temporary dams at different points along its length, so that weirs may be used for the measurement of large flows of water. It is also to be used as a large measuring hydraulic experimental purposes. A new Riehle Testing Machine has recently been installed. This makes possible the testing of all kinds of structural materials in tension, compression, and transverse strength up to a load of 200,000 pounds.

In the southwest corner of the basement is the cement laboratory, 46 x 26 ft. in area, equipped for the testing of cement, concrete, and similar structural materials. This includes a Fairbanks briquette testing machine and also a new Riehle Testing Machine for tension, compression and transverse strength of cement and mortar up to 5000 pounds. The northwest corner of the basement is taken up by a room for surveying instruments, with lockers, etc., for issuing equipment to field parties.

In the northeast corner of the first floor is a large laboratory equipped with applied mechanical apparatus; the southeast corner is an engineering museum, where models of bridges and other engineering structures are placed, so as to be accessible for inspection.

The museum is connected by sliding doors with the engineering library and reading room. Here is placed the valuable Croes library, recently donated by E. B. Van Winkle, of the class of 1860, and also the large collection of engineering drawings, etc., belonging to the department.

The first floor also contains three recitation rooms.

On the second floor the north half is taken up by two large lecture or society rooms, each of which can be divided by folding partitions into two recitation rooms of the usual size. The south half of this floor is taken up by a computing room and

building construction museum and one large and one small recitation room. In the southeast corner is the sanitary engineering laboratory.

On the third floor are two large drawing rooms, each about 24 x 60 ft., and three smaller drawing rooms. All of these rooms are well lighted by windows and skylights. On this floor is also a good-sized blue-print room, a photographic room, and a dark room.

Each floor contains two or more small private offices for the use of instructors; and the entire plan of the building is admirably adapted to the needs of the department.

Instruments and Apparatus. The department is supplied with field instruments of the best description, comprising a large theodolite, suitable for refined geodetic operations, transits, surveyors' compasses, prismatic compasses, Burnier's compass, solar compass, Y levels, plane tables, sextants, and a marine chronometer.

The extensive private collection of models and instruments belonging to the late Professor Gillespie was purchased for the engineering school.

The collection of models in descriptive geometry and stereotomy is very complete. The following are some of the most important:

The Olivier Collection. This consists of about fifty models, representing the most important and complicated ruled surfaces of descriptive geometry, particularly warped or twisted surfaces. Their directrices are represented by brass bars, straight or curved, to which are attached silk threads representing the elements or successive positions of the generatrices of the surfaces. Each of these threads has a weight suspended by it, so as always to make it a straight line. These weights are contained in boxes sustaining the directrices and their standards. The bars are movable in various directions, carrying with them the threads, still stretched straight by the weights in every position they may take; so that the forms and natures of the surface which they constitute are continually changing, while they always remain

ruled surfaces. In this way a plane is transformed into a paraboloid, a cylinder into a hyperboloid, etc.

These models were invented by the late Theodore Olivier while professor of descriptive geometry at the Conservatoire des Arts et Métiers, in Paris. One set of them is now deposited there, and a second is in the Conservatory at Madrid. Copies of some of them are to be found in most of the polytechnic schools of Germany. The Union College set is the original collection of the inventor, having been made in part by his own hands, and, after his death, in 1853, retained by his widow till bought of her by Professor Gillespie in 1855. It is more complete than that in the Paris Conservatoire. It may be worth noticing that the silver plates on the boxes, reading "*Inventé par Théodore Olivier,*" etc., were added by Madame Olivier, at her own expense, after the purchase, as a tribute to the memory of her husband, her own words being, "*Je tenais à ce que chaque instrument portât le nom du savant dont la réputation passera à la postérité.*"

Bardin's Models (Paris), in plaster, (seventy), of the intersections of prisms, pyramids, cones, etc.

Schroeder's Models (Darmstadt) of elementary descriptive geometry (twenty). The planes of projection are in wood, and the lines and surfaces in metal; models illustrating shades and shadows.

Stone Cutting Models (twenty), in plaster, selected from those of L'Ecole Polytechnique of Paris.

Professor Bardin's models (ten) in plaster, of oblique arches.

Groined and cloistered arch models (ten) in wood and plaster. Models of structures in stone, consisting of bridges, culverts, etc.

Winding-stair models in wood and plaster. Full sized models of voussoirs and skew-backs of an oblique arch.

Models in Topography. French and German plaster models, giving all the different forms of ground, accompanied by topographical drawings, showing how to represent these forms by contour lines; hatchings and shades from vertical and oblique light; models and maps in colored topography; a large model of Mount Cenis pass, showing the wagon road and contour lines.

Architectural Models. Models of the five orders of architecture from L'Ecole des Beaux Arts, Paris; portals; stairs; roofs; walls; buttresses; domes, etc.

Engineering Models. Schroeder's models of joints, brick bonds, etc.; spur wheels; bevel wheels; cranes; pile drivers; various forms of water-wheels; pumps; cylinders; valves; eccentrics; etc.; steam engines.

Casts of St. Venant's models showing the changes of form in bodies subjected to flexure. Full sized model of the liquid vein measured by Poncelet and Lesbros.

Models of bridges of various systems, comprising truss, suspension, tubular and arch bridges; Doyné's dynamometer bridge models showing, by means of dynamometer, strains at different points; models of roof trusses, arranged for using the dynamometer to show the different stresses.

Models of fortifications, illustrating Vauban's system; shot, shell, etc.

Models of culverts, piers, abutments, culvert heads, wing walls, rail sections, etc.

Maps, Drawings, Etc. This collection embraces a large number of maps, plates, profiles, topographical drawings and spherical projections; about fifty thousand engravings, lithographs, photographs and detail drawings of engineering and architectural structures; working drawings of machines, bridges, buildings, etc.

Physical Apparatus. To illustrate the lectures in physics, the college has an extensive collection of apparatus. This has been secured largely from foreign makers and includes special pieces of apparatus constructed under the direction of the late Professor Foster, besides sets of apparatus of standard patterns by Koenig, Duboscq, Ruhmkorff, and others.

In Mineralogy. The Wheatley collection contains nearly 4,000 specimens of minerals, the result of the labors of Charles M. Wheatley. All of these have been labeled according to the nomenclature and order adopted by Dana. They are without exception, open at all times to the students. They furnish an

admirable means of practical illustration in mineralogy. Among the rare and valuable specimens are those of anglesite, cerusite, mimetite and calcuprite, which in American specimens are equaled only by those in the British Museum. There are many fine specimens representing the noble metals from all parts of the world. There are few known species of minerals of which the collection does not contain some specimens.

In addition to this there is a large series of unlabeled specimens for crystallographic and blow-pipe examination.

In Metallurgy. The college possesses a suite of ores of the useful metals, comprising over 1,000 specimens. These have been arranged to illustrate their mode of occurrence and geographical distribution. In addition are the fluxes, fuels, etc., used in obtaining the metals from the ores, together with the slags and metals themselves in various forms. There is a large number of models and drawings of stacks, furnaces, etc.: also suites of specimens of wood, charcoal, mineral coal, peat, etc., for physical inspection; also specimens of most of the useful alloys.

In Chemistry. The chemical laboratory is furnished with tile-top desks and lockers, and all the modern apparatus necessary for work in general chemistry and qualitative and quantitative analysis. Ample hoods occupy one side of the laboratory, where the student may work with the disagreeable and poisonous gases. In the private laboratory of the professor of chemistry provision is made for any students who may desire to pursue advanced courses, either in volumetric analysis, water and milk analysis, organic chemistry, or any special work in connection with courses of other departments.

A large number of specimens of the materials used in the manufacture of the mineral and some of the organic acids; the crude products themselves and the materials used in the manufacture of the alkalis, soaps, matches, black lead, candles, petroleum products; linseed, olive, castor, cottonseed and other oils; paper, porcelain, glass, fire and building brick, mortar and cements, beet and cane sugar, white lead and other paints, etc., etc., form a part of the permanent collection of the department.

Electrical Engineering Department

Purpose and Methods. A course of instruction in electrical engineering was introduced in 1895, and in 1902 was re-organized and made into a separate department of the engineering school under the direction of Professor Charles P. Steinmetz, consulting engineer of the General Electric Company. In 1913 Dr. Steinmetz resigned as head of the department to become Professor of Electro-Physics, and Dr. Ernst J. Berg was appointed Professor of Electrical Engineering in charge of the department.

The course of studies offered by the department of electrical engineering aims at a thorough and broad scientific education of the prospective engineer, rather than the specific training of a specialist. The instruction, therefore, consists of three classes of studies. The general culture studies furnish such training as is now considered essential for every educated man, as languages, literature, history, etc. Such instruction extends over a large part of the first two years, and is then followed by a broad and general technical education, giving the student the fundamental principles and their application to all branches of engineering. Ultimately follows the specific instruction in electrical engineering, which, while it enables the student, after graduation, to enter the field of electrical engineering practice in the manufacturing or operating company or consulting engineer's office in a subordinate capacity only, has given him all the necessary requirements to gather in a few years' practice the knowledge needed for independent work of greater magnitude.

The instruction especially aims at a thorough understanding of the fundamental principles rather than a memorizing of numerous facts — that is, aims at quality, and not quantity — and as far as possible in all engineering instruction the subject is brought before the student in three different ways; by a theoretical lecture course with recitations, practical instruction in the electrical laboratory paralleling the lecture course, and, following this, the application of the knowledge gained in lecture courses and laboratory to calculation and design. Finally, more independent work on the solution of engineering problems is undertaken by the students. Throughout the technical course, by work in the

laboratory, some familiarity with the apparatus is given to the students before the technical side is taken up in the lecture course, so that when approaching the theoretical studies of electrical phenomena or apparatus the student is already to appreciate the practical value and importance of the subject with which the theoretical investigations deal.

Through the active interest which the General Electric Company takes in technical education, an arrangement has been effected between the college authorities and the officials of the company by which the students in the junior and senior classes are admitted to the company's works at appointed times, under the direction of their instructor, with the privilege and opportunity of studying and inspecting the plant and operations and of being regularly instructed therein.

List of Studies

In the following list of studies, only those subjects of the electrical engineering course which are not required in the other courses are described in detail. All the culture studies and most of the general engineering and scientific studies are pursued in common with the students of other engineering branches. Beginning with the junior year, however, the courses diverge. The electrical engineers take up a number of mechanical engineering subjects and continue them throughout the junior and first part of the senior year.

Studies also required in other courses are:

American History	Page 58
Rhetoric	Page 56
Economics	Page 61

In addition to the required studies one of the following subjects was open as an elective in the senior year, 1915-16:

Advanced Calculus	Page 65
Qualitative Analysis	Page 69
International Law and Municipal Government..	Pages 59, 63
Spanish	Page 53
Electron Theory	Page 67
English	Page 54

This list may be changed from year to year.

M.E.1. Advanced Mechanics. This course takes up the principles of mechanics from the engineering point of view. The principles of elementary mechanics are extended to three dimensions. The topics treated include: statics, dynamics of a particle, rigid dynamics, moments of inertia, work, energy, friction, etc.

Required of electrical engineering juniors. Four hours weekly during the first semester.

M.E.2. Advanced Mechanics. This course includes structures, strengths of material, and hydraulics.

Required of electrical engineering juniors. Five hours weekly during the second semester.

M.E.3. Thermodynamics. In this course the fundamental principles of thermodynamics are developed along with the mathematics necessary. The mechanical properties of perfect gases are treated, together with gas engine cycles, air-refrigeration, etc.

Required of electrical engineering seniors. Three hours weekly during the first semester.

M.E.4. Thermodynamics. The fundamental principles of thermodynamics are applied to saturated and superheated steam, ammonia, and other vapors. The principles of the reciprocating, steam turbine and gas engine are developed, and in this connection special study is made of the flow of fluids.

Required of electrical engineering seniors. Three hours weekly during the second semester.

E.E.1. Elements of Electricity, Magnetism, and Theory of Direct Current Machines. The prerequisites are physics and mathematics.

Required of electrical engineering juniors. Three hours weekly during the first semester.

E.E.2. Principles of Alternating Currents. This course includes the representation of alternating current waves and a review of the theory of complex numbers. The prerequisite course is E.E.1.

Required of electrical engineering juniors. Three hours weekly during the second semester.

E.E.3. Theory of Alternating Current Machines. This course

deals with the transformer and the alternator. The prerequisite course is E.E.2.

Required of electrical engineering seniors. Three hours weekly during the first semester.

E.E.4. Theory of Alternating Current Machines. Continued. This course deals with the synchronous motor, induction motor, rotary converter, alternating current commutator motors, and simple transient phenomena. Problems of illumination and power plant economics. The prerequisite course is E.E.3.

Required of electrical engineering seniors. Three hours weekly during the second semester.

E.E.13. Seminar. This is a course intended to bring the student in touch with phases of electrical engineering which do not enter entirely into the work of the other courses. It includes lectures by members of the department, the presentation and discussion of papers by the students themselves, and local trips of inspection to the works of the General Electric Company.

Required of electrical engineering seniors. One hour weekly during the first semester.

E.E.14. Seminar. This is a continuation of E.E.14 during the second semester.

E.E.21. Junior Electrical Laboratory. This is a course in laboratory work in which studies and measurements of elementary circuits are carried on. It deals also with more advanced direct current measurements and the tests of direct current generators and motors.

Required of electrical engineering juniors. Four hours weekly during the first semester.

E.E.22. Junior Electrical Laboratory. This is a course in laboratory work dealing with more advanced direct current measurements and the study of elementary alternating current circuits.

Required of electrical engineering juniors. Three hours weekly during the second semester.

E.E.23. Senior Electrical Laboratory. This is a course in labo-

ratory work dealing with alternating current circuits and apparatus, especially the transformer and alternator.

Required of electrical engineering seniors. Four hours weekly during the first semester.

E.E.24. Senior Electrical Laboratory. This is a course in laboratory work dealing largely with synchronous and induction motors and the synchronous converter.

Required of electrical engineering seniors. Four hours weekly during the second semester.

E.E.34. Electrical Machine Design. This is a course in the designing of electrical apparatus, particularly the transformer, generator, and the induction motor.

Required of electrical engineering seniors. Three hours weekly during the second semester.

Literary Essay. A literary essay on a subject determined by the department of English is prescribed during the first semester of the second year.

Special Lectures. During the year a few lectures on highly specialized subjects are given by engineers who are also attending the graduate courses in Electrical Engineering. These lectures are open to juniors, seniors and graduates, and are optional.

To juniors, seniors and graduate students of the course is available the notable privilege of becoming, upon payment of a nominal fee, members of the Schenectady Section of the American Institute of Electrical Engineers. Throughout the winter occur, before this society, a succession of lectures probably without an equal except before the national body itself.

Inspection Trips. It is desirable that each student in the electrical engineering courses participate during his college life in extended trips of inspection of engineering activities. Such trips are, therefore, arranged at a low cost to each man and vary from year to year. Last year the excursion was to Pittsfield and covered only one day. It is the policy of the department to continue to arrange such trips and to conduct them when sufficiently representative groups of men can attend.

Electrical Laboratory Equipment

The electrical engineering laboratory is a commodious, well-lighted building, and permits the arrangement and grouping of the machines in a flexible relation to each other.

The ground plan of the building is T-shaped. The upper bar of the T is two stories. The lower floor is devoted to the main laboratory, which is 101 ft. by 35 ft. outside dimensions.

Two large recitation rooms and offices occupy the major portion of the second floor.

The purpose of a college laboratory of electrical engineering is two-fold: To familiarize the student with the shape, appearance, relative proportions and construction of modern electrical apparatus, and to instruct him in the handling, assembling, testing and operation of electrical apparatus under normal and abnormal conditions.

Because of the great variety and large size of modern electrical apparatus, the former purpose can be fulfilled very incompletely only, even in the largest and best equipped college laboratories. Through the favorable disposition of the General Electric Company, by giving the electrical engineering students of Union College free access to the works and testing rooms, this purpose is admirably fulfilled here, and by frequent and regular inspection trips to the works and testing department of the Company under the direction of the college instructors, which trips constitute an integral part of the laboratory instruction, the students gain a very intimate knowledge of modern electrical apparatus of all types and sizes, not only when assembled and in operation and test, but also during their construction in the shops.

In equipping the college laboratory special consideration was therefore given to the selection only of such representative types of apparatus as can be handled, operated and tested by the students, and machines are of a size sufficiently large to correspond to modern practice, but not so large as to make the operation under abnormal conditions — that is, under conditions which as a rule are specially instructive — unsafe for the apparatus. All such machinery as the student can not be permitted to handle freely was excluded from the equipment.

Power is supplied from the following sources: A motor-generator set consisting of a 55-h.p. 3-phase 240 volt synchronous motor direct connected to a 30-kw., 125 volt direct current generator; a motor-generator set consisting of a 17.5-kw. direct current generator direct connected to a 3-phase 220-volt induction motor; connection with the 550-volt direct current trolley circuit of the Schenectady Railway Company; connection with a three-phase 2300-volt power circuit of the Schenectady Illuminating Company. In the latter case voltage is reduced by banks of step-down transformers, so that the students can handle the safe low-tension circuits only.

A secondary supply for standardization of instruments is also secured by means of a group of lead plate storage batteries charged by a mercury rectifier upon the alternating current power circuit.

The laboratory equipment contains a large number of direct and alternating current generators and motors of various design and capacity suitable for testing and all of the general and much special experimentation, also a large number of transformers, coils, and condensers, and the measuring instruments suitable for the work.

In addition there are standardizing instruments for the accurate calibration of meters, and for determining resistance, inductance and capacity.

Numerous arc-lamps of different types are arranged for operation either by a constant current transformer or from the 500-volt direct current supply or from a special 2,500-volt direct current generator.

Students are introduced to the direct study of wave forms and some transient phenomena by the use of an oscillograph, and to the phenomena of very high frequency through a fairly complete wireless telegraph installation.

For special study along the line of telephony, there is a complete set of apparatus presented by the Western Electric Company, including every part that comes into operation between two persons who may be located in different cities.

A second laboratory is located in the basement of Wash-

burn Hall, and consists of two very large rooms which are used mainly for advanced research and special experimentation. In this laboratory every graduate student has his desk and can set up his work without danger of interference from other workers. The equipment is of a special nature and varies according to the work being done.

In particular should be mentioned an artificial transmission line, constructed of large glass tubes wound with wire, and containing distributed capacity, so proportioned as to accurately represent an actual line of about one hundred and twenty-eight miles in length. The object of the line is to permit the study of the effects of switching and other transient effects which have been only partially understood in the design and operation of high voltage, high power systems.

The general engineering department offers the following graduate course in residence:

Graduate Courses

The Degree of M. C. E. This course of one year's resident graduate study, consisting of lectures, laboratory and research work, is open to graduates of the general or the sanitary engineering course of Union College or of any other institution of a standing recognized by the faculty. On its successful completion the degree of Master of Civil Engineering is conferred.

The electrical engineering department offers the following graduate courses in residence.

The Degree of M. S. in E. E. To students desiring to continue their studies a short time beyond the four-year course, a graduate course of one year is offered in which, besides instruction in higher branches of electrical engineering, there will be occasion to carry out original investigations in electrical engineering practice on subjects closely connected with the most recent advance of electrical engineering. This course leads to the degree of Master of Science in Electrical Engineering, and is open to graduates of Union College or of other institutions approved by the faculty. The work is to be done in residence, but the lectures are

given at such hours as frequently permit students and young engineers of the General Electric Company to attend.

A full year of college credit may be given exceptional students who complete the thorough and varied laboratory work of the student course of the General Electric company and also attend the graduate lectures at the college and do the prescribed work.

The following courses in electrical engineering are given:

E.E.101. A course dealing with electric transient phenomena and with problems in electro-dynamics.

E.E.102. A course which supplements E.E.101 and covers experimental work of an advanced character.

E.E.105. Lectures given at irregular intervals by Dr. Steinmetz on some phases of electro-physics.

The following courses in mechanical engineering are offered:

M.E.101. A course of lectures on hydrodynamics.

M.E.102. A course of lectures on elasticity.

M.E.103. A course of lectures on heat conduction.

The Degree of Ph. D. The degree of Doctor of Philosophy is not given on the completion of a certain amount of work or the study of stated subjects for a definite period of time, but is intended to be a mark of breadth of training and high attainment. It will be conferred upon the candidate who satisfactorily fulfills the following conditions:

1. A minimum of three full years of graduate work by residence is necessary in order to obtain the degree of Doctor of Philosophy.

2. The major subject of study must be electrical science.

3. Two minor subjects of study must be pursued, one of which is to be philosophy.

4. At the completion of the course, and two months before the conferring of the degree, a suitable thesis must be presented to the head of the electrical engineering department, representing original work and indicating strength and ability in independent investigation.

5. Fifty printed and bound copies of the thesis must be de-

posited in the college library before the successful candidate may receive the diploma for his degree. The degree may be conferred, however, before such copies are deposited, upon the presentation to the treasurer of proper security for their provision. In this case, a bound typewritten copy shall be placed in the library previous to the conferring of the degree.

Faculty members or students engaged in research work at the laboratories of the General Electric company, under the direction of the head of the department of electrical engineering, or of the professor of electro physics, at the college, not devoting their whole time to the work of the course, are given half time credit for work satisfactorily completed at the college.

Admission. The conditions governing admission to the graduate courses are given under the separate statements above. Correspondence regarding details should be addressed to the head of the department in which work is desired. (See page 88.)

CURRICULA OF ENGINEERING COURSES

Course Leading to Degree of B.E.

Freshman Year, all courses

First Semester

French 1 or 1a.....	(51)	3 hours
German 1 or 1a.....	(48)	3 hours
English 1.....	(54)	2 hours
Engineering Drawing GE1.....	(92)	3 hours
Mathematics 2.....	(64)	5 hours
Physiology and Hygiene 1.....	(73)	2 hours
Lectures GE 30.....	(93)	1 hour

Total 19 hours

Second Semester

French 1 or 1a.....	(51)	3 hours
German 1 or 1a.....	(48)	3 hours
English 1.....	(54)	2 hours
Engineering Drawing GE 1.....	(92)	2 hours
Mathematics 2.....	(64)	5 hours
Surveying GE 3.....	(92)	2 hours
Physiology and Hygiene 1.....	(73)	2 hours
Commencement Term Work GE33.....	(93)	

Total 19 hours

One credit hour is required in Gymnastics

Sophomore Year, all courses

First Semester

Mathematics 4a.....	(64)	4 hours
Physics 1.....	(66)	4 hours
Chemistry 1.....	(68)	3 hours
English Literature 3.....	(54)	2 hours
Surveying GE 4.....	(92)	2 hours
Rhetoric 10.....	(56)	1 hour
Summer Vacation Work GE 32.....	(93)	

Total 16 hours

Second Semester

Mathematics 4a.....	(64)	3 hours
Physics 1.....	(66)	4 hours
Chemistry 1.....	(68)	3 hours
English Literature 3.....	(54)	2 hours
Descriptive Geometry GE2.....	(92)	3 hours
Rhetoric 10.....	(56)	1 hour
Lectures GE31.....	(93)	1 hour
Commencement Term Work GE33.....	(93)	

Total 17 hours

Junior Year, General Engineering, Option A*First Semester*

Applied Mechanics GE9.....	(96)	4 hours
Topographical Surveying GE5	(95)	2 hours
Hydraulics GE14.....	(97)	3 hours
Chemistry 2.....	(68)	4 hours
Economic Geology 6.....	(72)	2 hours
History 2.....	(58)	2 hours
Rhetoric 11.....	(56)	1 hour

Total 18 hours

Second Semester

Mechanics of Materials GE10.....	(96)	4 hours
Route Surveying and Highways GE6.....	(95)	4 hours
Thermodynamics GE13.....	(97)	2 hours
Geodesy GE8.....	(95)	4 hours
Electrical Machinery GE15	(97)	2 hours
History 2.....	(58)	2 hours
Rhetoric 11.....	(56)	1 hour
Commencement Term Work GE33	(93)	

Total 19 hours

Senior Year, General Engineering, Option A*First Semester*

Railroad Construction GE17.....	(97)	3 hours
Stresses GE11.....	(96)	5 hours
Motors GE18.....	(98)	4 hours
Engineering Law GE24.....	(99)	3 hours
Architecture GE19.....	(98)	1 hour
Economics 2	(62)	3 hours
One Literary Essay.....		
One Technical Essay.....		
Summer Vacation Work GE32	(93)	

Total 19 hours

Second Semester

Building Construction GE20.....	(98)	3 hours
Engineering Design GE12	(96)	5 hours
Engineering Law GE24.....	(99)	3 hours
Water Supply and Sewage GE16.....	(97)	5 hours
Mathematics 7.....	(65)	3 hours
Thesis GE34.....	(100)	

Total 19 hours

Junior Year, General Engineering, Option B*First Semester*

Applied Mechanics GE9	(96)	4 hours
Topographical Surveying GE5	(95)	2 hours
Hydraulics GE14	(97)	3 hours
Elements of Law GE25	(99)	3 hours
Economics Geology 6	(72)	2 hours
History I	(57)	3 hours
Rhetoric II	(56)	1 hour
Summer Vacation Work GE32	(93)	

Total 18 hours

Second Semester

Mechanics of Materials GE10	(96)	4 hours
Route Surveying and Highways GE6	(95)	4 hours
Thermodynamics GE13	(97)	2 hours
Elements of Law GE25	(99)	2 hours
Electrical Machinery GE15	(97)	2 hours
History I	(57)	3 hours
Rhetoric II	(56)	1 hour
Commencement Term Work GE33	(93)	

Total 18 hours

Senior Year, General Engineering, Option B*First Semester*

Finance GE26	(99)	3 hours
Stresses GE11	(96)	5 hours
Motors GE18	(98)	4 hours
International Law (History 5)	(59)	3 hours
Architecture GE19	(98)	1 hour
Economics I	(62)	3 hours
One Literary Essay		
One Technical Essay		
Summer Vacation Work GE32	(93)	

Total 19 hours

Second Semester

Building Construction GE20	(98)	3 hours
Engineering Design GE12	(96)	5 hours
Administration GE27	(100)	2 hours
Mathematics 7	(65)	3 hours
Economics I	(62)	3 hours
Municipal Government (Economics 5)	(63)	3 hours
Thesis GE34	(100)	

Total 19 hours

Junior Year, General Engineering, Option C*First Semester*

Applied Mechanics GE9.....	(96)	4 hours
Topographical Surveying GE5.....	(95)	2 hours
Hydraulics GE14.....	(97)	3 hours
Chemistry 5.....	(70)	4 hours
Economic Geology 6.....	(72)	2 hours
History 2.....	(58)	2 hours
Rhetoric 11.....	(56)	1 hour
Summer Vacation Work GE32	(93)	

Total 18 hours

Second Semester

Mechanics of Materials GE10	(96)	4 hours
Route Surveying and Highways GE6	(95)	4 hours
Thermodynamics GE13.....	(97)	2 hours
Chemistry 5.....	(70)	4 hours
Electrical Machinery GE15	(97)	2 hours
History 2.....	(58)	2 hours
Rhetoric 11.....	(56)	1 hour
Commencement Term Work GE33	(93)	

Total 19 hours

Senior Year, General Engineering, Option C*First Semester*

Stresses GE11.....	(96)	5 hours
Motors GE18	(98)	4 hours
Engineering Law GE24	(99)	3 hours
Architecture GE19.....	(98)	1 hour
Heating, Ventilation and Sanitation GE21	(98)	3 hours
Economics 2.....	(62)	3 hours
One Literary Essay		
One Technical Essay		
Summer Vacation Work GE32	(93)	

Total 19 hours

Second Semester

Engineering Design GE12.....	(96)	5 hours
Engineering Law GE24.....	(99)	3 hours
Water Supply Sewage GE16.....	(97)	5 hours
Sanitary Analysis GE23	(99)	3 hours
Mathematics 7	(65)	3 hours
Thesis GE34.....	(100)	

Total 19 hours

Junior Year, Electrical Engineering*First Semester*

Advanced Mechanics ME1.....	(108)	4	hours
Electrical Engineering Theory EE1.....	(108)	3	hours
Electrical Engineering Laboratory EE2.....	(108)	4	hours
Mathematics 5.....	(64)	3	hours
History 2.....	(58)	2	hours
Rhetoric 11.....	(56)	1	hour
Summer Vacation Work.....	(93)		

Total 17 hours

Second Semester

Advanced Mechanics ME2.....	(108)	5	hours
Electrical Engineering Theory EE2.....	(108)	3	hours
Electrical Engineering Laboratory EE23.....	(109)	3	hours
Mathematics 5.....	(64)	3	hours
History 2.....	(58)	2	hours
Rhetoric 11.....	(56)	1	hour

Total 17 hours

Senior Year, Electrical Engineering*First Semester*

Thermodynamics ME3.....	(108)	3	hours
Electrical Engineering Theory EE3.....	(108)	3	hours
Electrical Engineering Laboratory EE22.....	(109)	4	hours
Seminar EE13 ¹	(109)	1	hour
Economics 2.....	(62)	3	hours
Electives.....	(107)	3	hours
Literary Essay.....	(110)		
Summer Vacation Work.....	(93)		

Total 17 hours

Second Semester

Thermodynamics ME4.....	(108)	3	hours
Electrical Engineering Theory EE4.....	(109)	3	hours
Electrical Engineering Laboratory EE24.....	(110)	4	hours
Seminar EE14.....	(109)	1	hour
Electrical Apparatus Design EE34.....	(110)	3	hours
Electives.....	(107)	3	hours

Total 17 hours

ATTENDANCE AND STANDING

Registration. Every student must report at the registrar's office at the beginning of each semester and register college or local residence.

Any change of residence during the semester must be reported at once at the treasurer's office.

Changes of Course. Students are not permitted to pass from one course to another, or to take any studies out of their regular order, without the specific authorization of the faculty.

Chapel. Morning worship is held in the chapel every college day and attendance is required of all students.

Reports. A daily record of scholarship and of attendance at class and chapel is kept and a report is sent at the close of each semester to the student's parent or guardian.

Standing. There are four grades of scholarship:—from 9 to 10 inclusive, first grade; from 8 to 8.9, second grade; from 7 to 7.9, third grade; from 6 to 6.9, fourth grade.

A student who receives a mark of 4 to 5.9 is reported as conditioned; below 4, as having failed.

A student who is reported as having failed in any subject must take that subject again in class; or he may be required, at the option of the department concerned, to make up the subject under an approved tutor, in such manner as the department may designate, and to pass an examination in it at the second conditions examination after the imposition of the mark of failure.

Students of exceptional standing in scholarship, not exceeding ten in number, are eligible for selection by the faculty for stage appointments at graduation.

Absences in General. Absences are entered against a student from the beginning of a semester until he reports his return to the registrar.

It is expected that for consecutive absences permission will be obtained in advance.

Permissions and excuses are given only by the committee on absences which meets every Monday afternoon from 2 to 5 o'clock.

Applications for excuses must be made on the first Monday following the date of the absence.

Class-room Absences. Attendance at all exercises is required and it is expected that no student will be absent except in case of unavoidable necessity.

No excuse remits any college work. The work lost by reason of excused absence must be made up in a manner satisfactory to the head of the department concerned, unless the nature of the work renders this impossible, in which case the student's grade will suffer.

After a number of unexcused absences equal to three weeks of recitations in any subject, the student is not allowed to continue his work in that subject, but must take it with the succeeding class.

Chapel Absences. Chapel attendance is recorded in terms of approximately twelve weeks each. Twelve absences without excuse are allowed each term. All absences after the first twelve lower the standing at the rate of one unit for every two absences.

No absences are excused except for protracted illness or for reasons in every way exceptional.

Applications for excuse from chapel for a term must be made within the first two weeks of that term.

In the determination of a student's general standing, marks for chapel attendance are counted as the equivalent of a one hour per week recitation. They affect the granting of scholarships and the selection of honor men.

Conditions. If entrance conditions are allowed, they must be made up promptly at the time appointed. Students who have any entrance conditions remaining after the April examinations, are classed as irregular students. Those who fail to remove all entrance conditions before the beginning of the next college year will not be admitted to any of the work of that year. No student who has any conditions unsatisfied at the close of the conditions examinations in September at the opening of the college year, is permitted to continue with his class without the express authorization of the faculty.

Conditions not removed at the next conditions examination held after their imposition must be made up in class at the first opportunity, and this work takes precedence of the regular work in case of conflict in the schedule. No senior who has failed to make up all his back work by the end of the first semester of senior year can be recommended for a degree, except by special vote of the faculty.

Examinations for the removal of conditions occur on the Saturday next preceding the opening of the fall term, and in December and April, on dates indicated in the college calendar. Registration for these examinations closes at 12 M. on the Saturday next preceding the date set for each. A fee for each examination to be taken must be paid at the time of registration, at the college office.

Students who have been excused by the dean, in writing, from any semester examination are reported "Not examined" and may be examined later, at a time to be approved by the instructor, but such examination cannot be postponed beyond the first conditions examinations after such report. A failure to pass is regarded as a condition and must be made up at the next following conditions examination.

Unless excused in writing by the dean, students absent from semester examinations are reported as "Not sustained," or "Failed."

Absence from any appointed examination is regarded as a failure, unless previously excused.

Irregular Students. Students who are seriously deficient in standing may be dropped to a lower class, or if the deficiency is such as to leave a prospect of regaining class standing, may be rated as irregular students. Irregular students have no class relation or class privilege; they are debarred from competition for prizes and from the attainment of special honors.

The evidence that a student's continuance in college is resulting in no advantage to himself, or in harm to others, will occasion his separation from the institution.

EXPENSES

Registration fee.....	\$5.00
Tuition, A. B., Ph. B. and B. S. courses, per year.....	90.00
Tuition, engineering courses, per year.....	150.00
Graduate courses in engineering, per year.....	75.00
Room rent in dormitories, per year.....\$60 to	90.00
Incidental fee, for maintenance of grounds and public rooms, use of library, gymnasium, etc., per year.....	24.00
Graduation fee, including diploma.....	15.00
Chemical laboratory fees:	
Courses 1 and 1a, per year.....	24.00
Courses 2, 2a, 3, 4 and 5, per year.....	45.00
Course 6, per year.....	60.00
Electrical laboratory fees:	
Junior year, per year.....	21.00
Senior year, per year.....	30.00
Biological laboratory fees:	
Courses 1 and 5, per year.....	6.00
Course 4, per year.....	18.00
Physics laboratory fees:	
Course 1a, per year.....	12.00
Course 2, per year.....	15.00
Conditions examination fee.....	2.00
Fee for certificate of work done.....	2.00
Fee for certificate of graduation.....	1.00
Master's degree, registration and diploma.....	20.00

In the course leading to the degree of Doctor of Philosophy the maximum payment will be \$300 if the degree be earned in five years from the time of registration.

Students who take their senior year's work at the Albany Medical College as provided on page 29, are charged \$125 for the year's tuition, \$50 to be paid to the treasurer of Union College and \$75 to the treasurer of the Albany Medical College.

One-half of tuition and other fees is due in advance on the first day of each semester, and is not returnable.

Students must conform to the rules of the treasurer's office regarding registration at the opening of each semester, and will

not be admitted to any classes or laboratories until the required fees are paid.

No deductions are made because of absence from college.

No part of a semester bill will be refunded for any cause.

Damage done by students to college property will be charged to their account.

No degree, certificate or dismissal will be given to any student until his bills are paid.

Board can be procured for \$3.50 to \$5 a week.

It is the custom of the student body to levy an annual campus tax of sixteen dollars, of which one-half is payable at registration on the first day of each semester. This money is used for the support of the different branches of athletics and of the musical association.

College Rooms

The college has three steam-heated dormitories. Most of the rooms are arranged in suites of two, and are all unfurnished; they are rented at prices varying from \$60.00 to \$90.00 per year for each student occupying a room. Students about to enter college who wish rooms in the dormitories should make early application to the assistant treasurer for a list of rooms giving location and price. No room is secured until a lease is signed and filed in the college office; a student must occupy the room for which he signs, as transfers are not allowed. The rooms are cared for by competent persons, employed and paid by the college; each occupant of a college room will be held responsible for any damage done to the room. At the end of the college year students giving up their rooms for any reason whatsoever must remove all furniture and property from their rooms not later than the Saturday following commencement day, as after this time the dormitories will be closed until the Saturday before the first registration day of the fall semester. The dormitories will also be closed during the Christmas recess.

Students leaving property in their rooms during the vacations do so at their own risk.

It is expected that students not living at home will room in the college dormitories, or if no college rooms are available, in places

approved by the college. A list of such rooms may be found at the college office.

Employment Bureau

The Christian Association acts as a bureau with the object of giving assistance to students who desire employment for the purpose of meeting the expenses of a college education. A considerable number of students meet the expense of board by acting as waiters in the various restaurants and boarding houses in the city. Others find employment as clerks in stores on Friday evenings and Saturday afternoons; others in caring for furnaces and in other work about private residences. Applications for the assistance of the bureau may be addressed to the secretary of the faculty.

SCHOLARSHIPS

Funds given especially for this purpose enable the college to offer aid to a number of students each year, as follows:

General Scholarships. General scholarships are available for students in the A. B., Ph. B. and B. S. courses.

Scholarships covering a part or the whole of the tuition charges are granted to students upon the following conditions:

1. The declaration of a purpose to remain in Union College until graduation.

2. An acknowledgment that the aid received is regarded as a debt of honor, to be paid as soon as possible after leaving college.

3. The presentation of satisfactory evidence of financial need. Scholarship aid will be withdrawn temporarily upon the failure of the student to be sustained in any subject, or upon his failure to maintain an average grade of eighty per cent. in the studies of any term, and after it has been withdrawn for three successive terms it will not be renewed.

Any serious breach of college discipline, evidence of moral delinquency, or repeated unnecessary expenditures will also result in the withdrawal of scholarship aid.

Credentials necessary for admission to another college will not be given to any scholarship student until he has repaid to the college treasury the full amount of scholarship aid received.

Application blanks will be provided by the secretary upon request.

John David Wolfe Memorial Scholarships. The income of a fund of fifty thousand dollars established by the generosity of Miss Catharine Lorillard Wolfe is designed to aid students from the southern states.

These scholarships are available for students in all courses and are governed by the conditions named above.

Application blanks will be provided by the secretary upon request.

Levi Parsons Scholarships. A generous benefaction by the late

Hon Levi Parsons, of Gloversville, N. Y., maintains several scholarships in each class, yielding one hundred and fifty dollars a year each.

Among applicants, preference is given :

First, to blood relatives of the founder, bearing his name and living in the county of Fulton, Montgomery or Hamilton, in the State of New York, and especially to those bearing his name and living in Gloversville or Johnstown, Fulton county.

Second, to applicants living in the following places, according to the following order :

1. The city of Gloversville, Fulton county.
2. The city of Johnstown.
3. The township of Johnstown.
4. The county of Fulton.
5. The adjoining counties of Montgomery and Hamilton.
6. The blood relatives living in any other part of the United States.

Nomination to scholarships is made by the board of directors of the Gloversville Free Library; and the nominees must satisfy the college requirements for admission. Applications are received by the directors of the Gloversville Free Library, Gloversville.

The continuance of these scholarships is subject to the rules stated on page 132 concerning the withdrawal of the general scholarships of the college.

Thomas Armstrong Scholarships. The late Thomas Armstrong, of Plattsburg, N. Y., provided for the grant of scholarships to residents of Clinton county, sons of practical farmers.

Nominations to these scholarships are made by the board of supervisors of Clinton county, and the yearly value of each scholarship is not to exceed two hundred dollars.

R. C. Alexander Prize Scholarship. The sum of four thousand dollars has been given in memory of the late Robert Carter Alexander, of the class of 1880, and a life trustee of the College, to be devoted to the establishment of a scholarship for the encouragement of classical studies.

The income of this fund, amounting to two hundred dollars

per year, is awarded as a prize scholarship, upon the following conditions:

1. Candidates must be students in the classical course, and of approved moral character.

2. They must be free from conditions and must have obtained an average of at least eighty per cent. in the studies of the first two terms of the freshman year.

3. They must pass successfully a special examination at the close of the freshman year in each of the following subjects: Latin, Greek, mathematics, English composition, and either French or German. These examinations will be based upon the work of the freshman year.

4. The award will be made to the candidate obtaining the highest general average in these examinations and in all the previous work of the college course.*

5. The prize scholarship will be forfeited upon evidence of moral delinquency, or upon failure to maintain an average grade of ninety per cent. in the work of any subsequent term. The scholarship, once lost, cannot be regained, but will be awarded, upon the above conditions, to a student in the next entering class.

6. All questions pertaining to the administration of this scholarship will be determined by a committee composed of the president of the college, the chairman of the scholarship committee of the faculty, and a member of the board of trustees.

Horace B. Silliman Scholarships. Three scholarships were founded by the late Horace B. Silliman, of the class of 1846, giving to each recipient the income from two thousand dollars annually.

These scholarships are awarded to active members of the college Young Men's Christian Association by a committee composed of the president, the dean, and the president of the Young Men's Christian Association, under such rules and conditions as may be determined by such committee, preference being given to students in the classical course.

The award is made to one student annually at the close of the freshman year.

*This scholarship is now held by John Charles Younie, of the class of 1918.

Daniel F. Pullman Scholarship. The late Daniel F. Pullman, of Knox, Albany county, New York, provided in his will for the establishment of a scholarship of the value of \$120 a year, to be given to a student in the classical course.

The award is made by the faculty, and in accordance with the terms of the will preference is given to members of the Methodist Episcopal Church.

Alumni Scholarships. Application for appointment to these scholarships must be made before September 1. The conditions with respect to college standing governing the award of the general scholarships of the college apply to this scholarship also.

Class of 1895 Scholarship. A fund has been given by the class of 1895 which provides for the grant of a scholarship of a yearly value not to exceed one hundred dollars.

The award is made by the faculty and, in accordance with the wish of the donors, preference will be given to descendants of members of the class.

Graduate Council Scholarships. A fund is given by members of the class of 1887 which provide for two scholarships of the yearly value of one hundred dollars each. These scholarships are subject to the general rules of the college as regards class standing and personal conduct. (Page 132.) The award is made by the donors on nomination by the secretary of the council.

Daniel Vedder Scholarship. By the will of the late Daniel Vedder, of Schenectady, a scholarship has been established, of the annual value of two hundred dollars.

The scholarship is awarded by the faculty, and is given to a student who is preparing to enter the Christian ministry.

The holder must maintain an average standing of ninety per cent., and must pledge himself to abstain from the use of intoxicating liquors and tobacco.

If none of the candidates meets in every respect the conditions stated in the will of the donor, the scholarship will be awarded in such a way as to carry out as fully as possible the wishes of the founder.

The award is made at the end of the freshman year.

Ichabod Spencer Scholarship Fund. The sum of four thousand dollars, to be known as the Ichabod Spencer Scholarship Fund and to be used for general scholarship aid, has been given by Mrs. Catherine Spencer Leavitt in memory of her father, the Rev. Ichabod Spencer of the class of 1822. The proceeds of this fund are used at the discretion of the trustees to aid worthy students in securing an education at Union College.

Law School Scholarships. Applicants for these scholarships, described below, must register with the dean of the college by May 15 of senior year.

John K. Porter Memorial Scholarships. A fund given by Mrs. John K. Porter, in memory of her husband, is designed to assist students who, after graduating from college, pursue the study of law. The fund provides, at present, for three scholarships of ninety dollars each. The awards are made at commencement to seniors chosen by the faculty.

Gilbert M. Spier Memorial Scholarship. A fund given by Mrs. Glover C. Arnold, in memory of her father, the late Judge Gilbert M. Spier, provides another scholarship for students of law who go from Union College to the Albany Law School, another department of Union University. The sum of ninety dollars is awarded at commencement to the senior chosen by the faculty, the choice being made on the basis of excellence in historical studies.

William C. Saxton Scholarships. By the will of Anna C. Saxton the sum of ten thousand dollars was bequeathed to Union College for the purpose of founding the William C. Saxton Fund. This fund provides for the payment of the tuition of one student in each of the three classes in the Albany Law School. These students must be graduates of Union College and are appointed, one each year, by the faculty of Union College. The first appointment will be made in 1917.

Erie County Scholarships. Through the generosity of Mr. Thomas B. Lockwood of Buffalo, Union College is enabled to offer a certain number of scholarships annually to graduates of registered high schools in Erie county.

The tenure of the scholarships is subject to the general scholarship rules of the college as published in the annual catalogue.

Chester C. Thorne Scholarship. The late Rev. Chester C. Thorne, of the class of 1857, has endowed a scholarship of the annual value of two hundred dollars. The scholarship will be awarded to a student in one of the academic courses at the end of his junior year; it is given on the basis of character and financial need and is awarded by the faculty.

The tenure of the scholarship is subject to the general scholarship rules of the college as published in the annual catalogue.

Genesee Valley Scholarships. The Alumni Association of the Genesee Valley generously offers a scholarship to residents of towns included in the active membership of the association.

The tenure of the scholarship is subject to the general scholarship rules of the college as published in the annual catalogue.

General Electric Company Scholarships. The General Electric Company has made provision for three scholarships, nominations to which are made by the company. One incumbent will be named each year until three scholarships are in effect. The scholarships are intended primarily for the encouragement of electrical engineering studies, but the company may appoint students in any course. The scholarships provide for tuition fees.

PRIZES

The following prizes are awarded from funds given especially for this purpose:

Blatchford Oratorical Medals. The Hon. Richard M. Blatchford, LL. D., of New York city, founded oratorical prizes, consisting of two gold medals of the value of the interest on \$1,000, which are given to the two members of the graduating class who deliver at commencement the best orations, "regard being had alike to their elevated and classical character and to their graceful and effective delivery." These medals are awarded by a committee appointed by the trustees, and are presented at the close of the exercises.

Warner Prize. The Hon. Horatio G. Warner, LL. D., of Rochester, N. Y., founded an annual prize to be presented at commencement to the "graduate of Union College, classical or Latin-scientific course, who shall reach the highest standing in the performance of collegiate duties, and also sustain the best character for moral rectitude and deportment, without regard to religious practice or profession." The prize is a silver cup and is awarded by the faculty.

Ingham Prize. The Hon. Albert C. Ingham, LL. D., of Meridian, N. Y., founded an annual prize of the interest of \$1,000 (in the form of plate, or medal, or money, or both medal and money, as preferred), to be awarded at commencement to that senior connected with the college for not less than two years who shall offer the best essay on one of two assigned subjects in English literature or history.

The essay must be typewritten, and must contain not less than 4,000 nor more than 4,500 words. Its signature (fictitious) and the writer's real name must be enclosed in a sealed envelope; the signature and the name of the prize being given on the outside. The essay, with the note, must be presented by noon on the first day of May.

Allen Essay Prizes. The Hon. William F. Allen, LL. D., of Oswego, N. Y., established a fund of \$1,000, the interest of which

is devoted to prizes for the best three essays on any subject, submitted by members of the senior class.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham essay) by noon on May 1st. The prizes are awarded at commencement.

Oratorical Prizes. Prizes are presented at commencement to the two juniors and the two sophomores who deliver the orations best in composition and delivery on the occasion of prize speaking in commencement week. Four juniors and four sophomores are selected for this competition by a committee of the faculty on the fifteenth of April. Candidates must be in full standing on appearance before the committee.

Allison-Foote Prizes. Mr. George F. Allison, of New York city, and the late Wallace T. Foote, of Port Henry, N. Y., founded a prize for the encouragement of debate in the literary societies. The prize consists of \$100 in cash, and is awarded as the result of a public competition between representatives of the Adelpic and Philomathean Literary Societies. Fifty dollars is awarded to the society presenting the strongest argument. The remaining \$50 is awarded to the debater who makes the best single speech, regardless of his society relations. Contestants must have engaged in at least ten debates in their respective societies during the college year immediately preceding. All further details are left to the determination of a committee, consisting of the president, the dean of the college, and the professor of Rhetoric.

Daggett Prize. In 1899 Miss E. Josephine Daggett bequeathed to Union College the sum of \$1,000, the interest of which is devoted to a prize for conduct and character, without respect to scholarship, to be given at Commencement to a senior who shall have passed through a full course of four years at the college.

Pullman Prizes. Mr. Daniel F. Pullman, of Knox, Albany County, New York, bequeathed to Union College the sum of \$2,000 to found two annual prizes.

The Pullman Classical Prize. This prize of \$40 is given to that member of the Methodist Episcopal Church in the graduating

class who, in an attendance of three years, has attained the highest standing in scholarship in the classical course.

The Pullman Engineering Prize. This prize of \$40 is given to that member of the graduating class who has taken the full course in the engineering department and who has attained the highest standing in that course, preference being given to members of the Methodist Episcopal Church.

Baggerly Prizes. Mr. H. L. Baggerly, of the class of 1894, has founded two prizes to be offered annually for the best essays on a question of economics or government. The topic is announced at the beginning of the winter term. The prizes are of \$50 and \$25, and are open to competition by members of the senior and junior classes.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham and Allen essays) by noon on May 1st.

The award is made by a committee of the faculty.

Bailey Prize. A silver cup, of the value of \$50, has been offered by Dr. Frank Bailey, to be awarded annually to that member of the senior class who has rendered the greatest service to the college in any field. In awarding this prize, consideration will be given to any effort resulting in conspicuous improvement in the conduct of athletic sports or in the character of undergraduate publications; in the increase of college enthusiasm or the elevation of the tone of college life; in the advancement of the interests of the college among preparatory schools or in the community as a whole; or in any addition to those things which bring honor to the name of Union.

Van Orden Prize. The Van Orden Prize was founded by the late Wessel Ten Broeck Van Orden in memory of his uncle, Wessel Ten Broeck Van Orden, of the class of 1839. It is awarded annually to a member of the freshman class for excellence in English composition. The basis of the award is the class work in rhetoric and composition, and a special essay. The essays are based upon certain works of English literature, the titles of

which are announced early in the fall. The prize is the interest on \$1,000, and is awarded partly in books and partly in money.

Goodrich-Duane Prizes. Two prizes, of \$30 and \$20, are awarded to the best speakers in an extemporaneous debate held in commencement week in each year. A general topic is previously announced, and the particular subject of debate is given on the evening of the contest. The competition is open to students of all classes.

The first prize is given by Mr. James A. Goodrich, of the class of 1879, and the second prize by Dr. Alexander Duane, of the class of 1878.

American History Prize. A prize of \$25 has been offered by Willis T. Hanson, Jr., A. M., for the best thesis on a topic dealing with the history of Schenectady.

The essays must be typewritten in duplicate and must contain not less than 4,000 words. Both copies must be submitted not later than May 15th to the head of the Department of History. The award will be made under the direction of this department, preference being given to theses based upon original sources.

Debate Medals. Intercollegiate debate medals are awarded by the Union College Debating Council each year to those students who worthily participate in at least two intercollegiate debates during the academic year.

Underclass Debate Prize. A prize of \$10 is awarded to the member of either debating teams in the Sophomore-Freshman debate who makes the best single speech, regardless of class victory.

Ernst J. Berg Scholarship Cup. A silver cup is offered by Dr. Ernst J. Berg, to be awarded at the opening of the fall term, to that fraternity or like organization whose scholarship during the preceding year was highest.

Fuller Prizes in Chemistry. In 1914 Dr. Robert M. Fuller, of Schenectady, N. Y., founded two prizes, consisting of a silver, and a gold medal, of the value of twenty dollars and thirty dollars respectively. These medals are awarded annually; the

silver medal to that member of the sophomore class whose work of the first two years in the department of chemistry has given the greatest promise of a successful career in that subject; the gold medal to that member of the senior class whose standing in the department has been of high grade, and who has shown the most ability in original experimental work. The medals are awarded by a committee composed of the president, the professor of chemistry, and one other member of the faculty appointed by the president.

Freling H. Smith Prize in History. Mr. Freling H. Smith, of the class of 1865, has founded an annual prize of fifty dollars in the department of history. The prize is awarded at commencement and is open to seniors who are qualified to take special honors in history. The award is based upon a thesis written under the direction of the department of history. Candidates must register with the head of the department not later than November 1.

DEGREES AND HONORS

The candidate for a degree must have paid all dues to the college treasurer, and returned all books borrowed from the college library; he must also attend the conferring of degrees, or be expressly excused therefrom. The candidate for a bachelor's degree must have entered college not later than the beginning of the first senior term.

Degrees for Resident Study

The degrees of the college are conferred by authority of the board of trustees upon candidates who have successfully completed courses of resident study, as follows:

The Bachelor's Degree. The degree of Bachelor of Arts (A. B.) will be conferred upon candidates who have successfully completed Course 1, page 28; the degree of Bachelor of Philosophy (Ph. B.), upon those who have successfully completed Course 2, page 28; the degree of Bachelor of Science (B. S.), upon those who have successfully completed Course 3, page 28; the degree of Bachelor of Engineering (B. E.), upon those who have successfully completed Course 4, first, second or third division, pages 28-29.

The Master's Degree. The degree of Master of Civil Engineering (M. C. E.) will be conferred upon candidates who have successfully completed Course 6, first division, page 29; the degree of Master of Science in Electrical Engineering (M. S. in E. E.), upon those who have successfully completed Course 6, second division, page 29.

The Doctor's Degree. The degree of Doctor of Philosophy (Ph. D.) will be conferred upon students of electrical science who fulfill the requirements stated on pages 113-115.

Degrees for Non-Resident Study

The following degrees for non-resident study may be conferred upon graduates of Union College who meet the requirements specified below:

Academic Degrees. The degree of Master of Arts (M. A.) or

of Master of Science (M. S.) will be given to graduates of Union College who have been registered as candidates for the degree not less than two years, have completed definite courses of advanced study in two departments, and have submitted a satisfactory thesis and passed satisfactory examinations. The total amount of work done is intended to be the equivalent of one year of resident study.

A year of resident study in any non-professional graduate school, approved at the time of registration by the two departments concerned, will be accepted instead of the two years' study above mentioned on fulfillment of the same conditions regarding thesis and examinations.

Each candidate for this degree must register with the dean of the college his name, his address, and the two departments chosen, not later than the fifteenth of October of the year for which he desires registration.

The thesis must be presented to the dean by May first for submission to the faculty in time to provide for all necessary examinations before commencement.

A fee of \$20 is charged, which covers examinations and diploma; of this amount \$10 is payable at the time of registration and \$10 at the time of the final examinations.

Engineering Degrees. On fulfilling the conditions prescribed below graduates of Union College in the general and sanitary engineering courses may become candidates for the degree of Civil Engineer (C. E.); graduates in the course in electrical engineering may become candidates for the degree of Electrical Engineering (E. E.)

The candidate, after the completion of his undergraduate course must have been engaged for at least three years in professional engineering work of a high order and in positions favorable to the acquisition of valuable engineering experience and to the development of professional ability and judgment.

If the candidate's professional experience is found adequate in character and amount, he is required to submit a satisfactory thesis on an approved subject embodying a contribution by himself to engineering knowledge or literature.

If the thesis is found satisfactory the candidate may be called before an examining committee selected by the department in which he is a candidate and must satisfy the committee that his training, experience, judgment and ability are such as to warrant the conferring of the degree.

If, in the opinion of the head of the department concerned, the candidate has satisfactorily met the above requirements he may be recommended for his degree, to be conferred by the trustees at the following commencement.

The diploma fee for this degree is \$10.

Honors

All commencement prizes are limited to A. B., Ph. B. or B. S. students who have entered at or before the beginning of the senior year, and who are in full standing at the close of the first semester; and to engineering students entered likewise and in full standing at the close of the first semester, in both the engineering course and the English department of the B. S. or Ph. B. course.

Commencement Appointments. These honors may be assigned to ten seniors, as stated under Standing, page 121. Provisional appointments are made at the close of the first semester of senior year, and become final if those who receive them retain the same relative rank to the end of their course. Under present regulations, no other person can become competitor for the Blatchford Oratorical Medals.

Seniors not in full standing at the close of the first semester are ineligible to a Commencement appointment.

Students who receive Commencement appointments as the result of the second semester's work are excused from speaking unless the faculty direct otherwise.

The Valedictory. This honor is awarded to the senior of highest standing among the ten receiving Commencement appointments.

Special Honors. Special honors are also given at graduation under the following conditions: Any department may offer a

course, approved by the education committee, leading to special honors. The head of a department may direct the choice of electives in other departments, for honor students, to the number of six hours in each year. The time of registration for honors will be determined separately for each department. The candidate for special honors must have attained in all the studies of the department in which he tries for honors a rank of not less than ninety per cent. of the maximum. The evidence that he has successfully completed the extra course prescribed for him must be submitted not later than June 1st of the senior year to the faculty, who shall decide in each case whether the work is worthy the names of the students who take honors are printed on the of an honor. The honors attained are stated in the diploma, and Commencement programme. No student may try for honors in more than two departments.

Phi Beta Kappa. At the end of the third term of the senior year, one-third of the members of the graduating class in the classical course, candidates for the degree of Bachelor of Arts, may be elected to membership in the Phi Beta Kappa society. The election is based upon scholarship and character and is given, as a rule, to the men who stand highest in scholarship in their class.

The Alpha of New York chapter was established in 1817; and ever since that time election to the society has been one of the highest distinctions to be gained by scholarship.

Sigma Xi. Election to the honorary scientific society of Sigma Xi, is one of the honors open to seniors of marked ability in the scientific and engineering departments. Membership is confined to the faculty, senior candidates for graduation, and alumni. The election occurs during the latter part of the senior year and selections are made on the basis of high general scientific or engineering ability and particularly as a mark of promise of ability in research and independent work.

The society was founded at Cornell University in 1886 and has chapters at more than twenty of the leading colleges and universities of the country. The Union chapter was established in 1887, since which time about one hundred members have been elected by this chapter.

DEGREES CONFERRED

AT THE

**ONE HUNDRED AND NINETEENTH ANNUAL
COMMENCEMENT**

, JUNE 9, 1915

Honorary**LL. D.**

Henry Cabot Lodge.....Nahant, Mass.

D. D.

Joseph D. Dysart.....Milwaukee, Wis.

Litt. D.

Edward Carey.....New York City

L. H. D.

Charles C. Lester.....Saratoga Springs

Sc. D.

Robert M. Fuller.....Schenectady

A. M.

Thomas H. Feary.....Canandaigua

Francis T. Vaughan.....Little Rock, Ark.

Edward H. Ripley.....Mendon, Vt.

A. B.

(Veterans of the Civil War)

James Ashbel Alice, '64.....Syracuse

James Madison Andrews, '67.....Saratoga

Edwin Malaney, '63.....Neponset, Ill.

John Stone Bradley, '64.....Portland, Ore.

James L. Seward, '64.....Lawrenceville, Ill.

A. B.

(Veterans of the Civil War, In Memoriam)

Edward Payson Berry, '61.....Captain, 5th N. J. Vols.

Charles H. Savage, '61.....Corporal, 13th N. Y. Vols.

Charles M. Carter, '62.....Private, 153d N. Y. Vols.
 Richard Esselstyne, '62.....Sergeant, 14th N. Y. Vols.
 Joseph McConnell, '62.....Private, 18th U. S. Infantry
 Henry W. Nichols, '62.....1st Lieutenant, 7th Mass. Vols.
 Angus Cameron, Jr., '63.....2d Lieutenant, 121st N. Y. Vols.
 John Jordan Holloway, '63.....Private, 1st Kentucky Vols.
 William S. Holloway, '63.....Private, 25th Kentucky Vols.
 Henry E. Munger, '63.....Sergeant, 18th N. Y. Vols.
 Henry R. Schwerin, '63.....1st Lieutenant, 119th N. Y. Vols.
 Leander Willis, '63.....1st Lieutenant, 116th N. Y. Vols.
 James Dorr Clyde, '64.....Private, 44th N. Y. Vols.
 Henry A. Crary, '64.....Sergeant, 177th N. Y. Vols.
 Anson D. Fessenden, '64.....1st Lieutenant, 63d Mass. Vols.
 James Watson Fisher, '64.....Private, 71st N. Y. Vols.
 Albert Heywood, '64.....Private, 177th N. Y. Vols.
 Jacob M. Howard, Jr., '64.....2d Lieutenant, 24th Mich. Vols.
 Charles F. Lewis, '64.....Private, 119 N. Y. Vols.
 James O. Liebenau, '64.....Private, 177th N. Y. Vols.
 Edward J. Maxwell, '64.....Private, 63d N. Y. Vols.
 Samuel F. Prentiss, '64.....1st Lieutenant, 13th Vt. Vols.
 Marvin Waite, '64.....Private, 8th Conn. Vols.
 Charles M. Ballentine, '65.....Private, 153d N. Y. Vols.
 Vedder Van Dyck, '65.....Private, 177th N. Y. Vols.
 Edwin Russell, '65.....Captain and Aide-de-Camp on Staff of
 General Russell

In Course

M. S. in E. E.

Clarence Nicholls Bridge.....Charlevoix, Mich.
 P'eng-Shou Chu.....China
 Louis De Bois De La Vergne.....Kingston
 Richard William Evans.....Fergus Falls, Mich.
 John Henry Gardner, Jr.....Meadowdale
 Luther Alfred Hagar.....Plattsburg
 Harry Gard Knox.....Annapolis, Md.
 Kuang Ping Koo.....China
 Everett Samuel Lee.....Schenectady
 Alfred Vivian Mershon.....Rahway, N. J.

Walter Curtis Smith.....	Lynchburg, Va.
Alexander Russell Stevenson, Jr.....	Schenectady
Hugh Montgomery Stoller.....	Schenectady
Mong Kang Ts'en.....	China
Ting Shien Yeh.....	China

Class of 1915

A. B.

Karl Engle Agan.....	Warrensburg
Harry Floyd Bain.....	Argyle
Donald Alexander Coulter.....	Schenectady
Robert Livingston Duane.....	New York City
James Leo Fitzgerald.....	Ilion
Barlow Tingley Loomis.....	Unadilla
Austen Geddes Martin.....	Schenectady

Ph. B.

Ambrose M. Clark.....	Schenectady
Thomas Ashley Dent, Jr.....	Pelham Manor
Roger William Macmillan.....	Schenectady
Frank Stanley Randles.....	Argyle
Earl J. Sharpe.....	Altamont
Frank Leander Smith.....	Morrison, Ill.
Donald Arthur Starbuck.....	Gouverneur

B. S.

Walter C. Baker.....	Oneida
David John Beaver.....	Schenectady
Jacob Julius Beaver.....	Schenectady
Raymond Stewart Blodgett.....	Jefferson
Maurice Robinson Brown.....	Amsterdam
Carl James Byron.....	Ilion
Prescott Coyle Cleveland.....	Jamaica
Henry Louis Faust.....	Schenectady
Myer Grosberg.....	Schenectady
Ernest Baker Houghton.....	Schenectady
William Arthur Hughes.....	Schenectady
Hazen Hunter.....	Florida
Thomas Philip Keating, Jr.....	Schenectady

Stanley Maynard Smith.....	Herkimer
William Winslow Wait.....	Schenectady

B. E.

Wesley Hinson Baldy.....	Buffalo
Ralph Emmons Boyce.....	Nassau
Charles Valentine Brewster.....	Scotia
Edward Peck Culver.....	Hudson Falls
Samuel Henry Frankel.....	Schenectady
Howard Snow Hawn.....	Ravena
William Hubert Mandeville.....	Elmira
John L. Scully.....	Schenectady
Raymond Barteau Arthur.....	Warrensburg
Harry Randall Ballou.....	Rutland, Vt.
Fred Dales Cure.....	Pine Hill
Harold John Delchamps.....	Mobile, Ala.
William John Fisher.....	Buffalo
Harold Duane Godfrey.....	Rosebank
Albert Ives Hall.....	Saratoga
Lynde DeForest Hokerk.....	Gloversville
Horace Newton Hubbs.....	Geneva
Edward Richard Hughes.....	Schenectady
Cornelius Mahaney.....	Fort Plain
Harry Benjamin Marvin.....	New York City
Edwin Asa Norton.....	Derry, N. H.
David Benson Page, Jr.....	Oswego
Charles Howard Purdy.....	Downsville
David George R. Stoetzel.....	Schenectady
Gordon O. Vosburgh.....	Johnstown
Gerrit Van Wagenen Wood.....	Buffalo
Howard Lee Woods.....	Albion

AWARDS 1915**Valedictory**

Frank Stanley Randles.....Argyle

Commencement Orations

David John Beaver.....Schenectady

Jacob Julius Beaver.....Schenectady

Henry Louis Faust.....Schenectady

Samuel Henry Frankel.....Schenectady

Roger William Macmillan.....Schenectady

Cornelius MahaneyFort Plain

Engineering Theses

Samuel Henry Frankel.....Schenectady

Edward Peck Culver.....Hudson Falls

Raymond Barteau Arthur.....Brooklyn

Charles Howard Purdy.....Downsville

Special Honors

In Chemistry..... David John Beaver.....Schenectady

Jacob Julius Beaver.....Schenectady

William Arthur Hughes.....Schenectady

Henry Louis Faust.....Schenectady

In English..... Austen Geddes Martin.....Schenectady

In French..... Frank Stanley Randles.....Argyle

In Greek.....*Donald Alexander Coulter....Schenectady

In Latin.....*Donald Alexander Coulter....Schenectady

Austen Geddes Martin.....Schenectady

In Rhetoric..... Raymond Stewart Blodgett.....Jefferson

*Donald Alexander Coulter....Schenectady

Prizes

Blatchford Oratorical Medals. 1st, Henry Louis Faust; 2nd,
Roger William Macmillan

Warner Prize. Frank Stanley Randles

Allen Prizes. Maurice Robinson Brown, Karl Engle Agan,
Robert Livingston Duane

*Deceased.

Prizes for Oratory. Juniors: Eugene J. Hummer, Revington Lyman Embree. Sophomores: Jacob Mitchell Frankel, Wilson Ober Clough

Allison-Foote Prizes. Won by the Philomathean Society and Avrom Myer Jacobs

Daggett Prize. Raymond Stewart Blodgett

Pullman Prizes. Austen Geddes Martin, Raymond Barteau Arthur

Baggerly Prize. Avrom Myer Jacobs, Richard Erastus Taylor

Bailey Prize. Lynde DeForest Hokerk

Van Orden Prize. Clyde Alexander Heatly

Goodrich-Duane Prize. Spencer Brownell Eddy, Charles Foster Brown

Ingham Prize. Austen Geddes Martin

Intercollegiate Debate Medals. Raymond Stewart Blodgett, Avrom Myer Jacobs, Milton Hijmes Sternfeld

Underclass Debate Prize. Spencer Brownell Eddy

American History Prize. Ernest Baker Houghton

Alexander Prize Scholarship. John Charles Younie

Horace B. Silliman Scholarship. Harold Lewis Cook

John K. Porter Memorial Scholarship. William Arthur Hughes, Roger William Macmillan, William Hubert Mandeville

Ernest J. Berg Scholarship Prize. The Pyramid Club

Electrical Engineering Seminar Prize. Cornelius Mahaney, Edwin Asa Norton

Sigma Xi

Raymond Barteau Arthur

David John Beaver

Jacob Julius Beaver

Edward Peck Culver

Samuel Henry Frankel

Frank Stanley Randles

ALBANY MEDICAL COLLEGE

The Albany Medical College was organized in 1838 and incorporated in 1839, in which year its first class was graduated. In 1873, by the incorporation of Union University, the school of medicine in Albany was united with Union College in Schenectady only a few miles distant. The relationship was, however, in many respects only nominal, for the medical school was managed independently by a faculty responsible solely to its own board of trustees. Because of the great advancement in medical education and the desire for true university control, the trustees of the Albany Medical College in 1915 appointed an executive committee of thirteen to control the educational policy of the medical school, eight members of which are governors of Union University. Also upon request of the trustees of the Medical College the governors of Union University have appointed a similar committee identical in personnel.

A complete reorganization of the school has been effected during the past year. Largely increased hospital facilities have been assured, with teaching services in both medicine and surgery, students having immediate responsibility under supervision. The laboratory staff has been increased and the courses have been re-arranged to conform with improved methods. With these changes, the Albany Medical College is prepared to furnish instruction which meets the highest demands of modern medical education.

The executive faculty is composed of the chancellor of the university, the heads of the five major departments of medicine, two special departments and the dean.

The requirements for admission, promotion and graduation have been raised, and the classes are restricted in number so that the important personal relation between teacher and student may be maintained.

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Assistant in Medicine

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Instructor in Physiology

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Secretary and Instructor in Biological Chemistry and
Pharmacology

Assistant in Physiology

Assistant in Pharmacology

Department of Pathology

ELLIS KELLERT, M. D.
Assistant Professor of Pathology

MORRIS BRYAN BEECROFT, M. D.
Instructor in Pathology

JOSEPH LEWI BENDELL, M. D.
Instructor in Pathology

GEORGE VICTOR GENZMER, M. D.
Instructor in Pathology

Special Lecturers and Instructors

A systematic and comprehensive course in Public Health, and subjects directly and indirectly related, has been arranged. This is made possible by the cordial co-operation of the numerous officials of the State Departments of Education, of Health, of Agriculture, of Labor, the City Department of Health, the Albany Law School and others eminent in special public health work or related fields. This course of lectures and demonstrations will form an integral part of the instruction of the fourth year students and most of these exercises will also be open to the public. The course will be held in the State Education Building each Wednesday at 4:30 P. M.

CALENDAR

1915

Regular winter session begins.....Monday, September 20
Election day — recess.....Tuesday, November 2
Thanksgiving — recess.....Thursday, November 25
Christmas vacation begins.....Thursday, December 23

1916

Lectures resumed.....Monday January 3
Second semester begins.....Tuesday, February 1
Lincoln's birthday — recess.....Friday, February 12
Washington's birthday — recess.....Tuesday, February 22
Memorial day — recess.....Tuesday, May 30
Commencement.....Thursday, June 8

REQUIREMENTS FOR ADMISSION

Each candidate for the Degree of Doctor of Medicine is required to present his medical student's certificate from the examinations division of the Board of Regents of the State of New York.

In addition to the regents' certificate the student is also required to show evidence of the *satisfactory* completion, in a recognized college or scientific school, of at least one year's course of study including French or German, biology, physics and chemistry, or an equivalent. Union College, the academic

department of Union University, Schenectady, N. Y., has arranged for such a course. These requirements are to be satisfied before matriculation. Deficiencies in single subjects may be made up prior to admission. The classes are limited in number and the College reserves the right in its discretion to refuse applicants, if the number admitted is as large as can be effectively taught. Students are requested to apply for admission before July 1 on blanks to be furnished by the Dean's office. All inquiries and other communications should be addressed to Thomas Ordway, M. D., Dean, Albany Medical College, Albany, N. Y.

Admission to Advanced Standing

All candidates for the Degree of Doctor of Medicine desiring to be admitted to advanced standing must satisfy the conditions referred to in the preceding paragraph, and in addition must present evidence that they have satisfactorily completed, at an approved medical school, the courses from which exemption is desired. They must also pass any examinations which may be deemed desirable by the heads of the several departments.

GENERAL PLAN OF INSTRUCTION

The first two years of the medical course are devoted mainly to the fundamental sciences, the larger part of the time being spent in practical work in the laboratories. The work of these years is on the so called "concentration plan" similar to that used at Harvard by which the student spends all day for the first half of the first year on gross and microscopic anatomy and embryology and in the second half of the first year the forenoons are devoted to physiology and the afternoons to biological chemistry. In a similar way pathology and bacteriology are studied in the first half of the second year. In the last half of the second year pharmacology, physical examination of normal infants, children and adults, certain phases of obstetrics, anatomy and special clinics are given in preparation for the clinical work of the last two years.

In the last two years the various clinical branches are studied in the wards, hospitals, dispensaries and clinical laboratories.

The third year is in part devoted to surgical pathology, clinical pathology, physical diagnosis of both medical and surgical conditions in the dispensaries and wards, and to general dispensary work. Didactic and clinical lectures in medicine are given during the third and fourth years as a basis for correlating and amplifying the information gained in the clinics and at the bed-side. In the third and fourth years also, the special branches of medicine are studied by small groups of students. In the fourth year similar groups have bed-side instruction and responsibility, under supervision, in surgery and medicine.

In the second year, following the course in pathology and bacteriology, work by the "concentration system" is given in laboratory instruction in methods and experience in the examination of water, milk, air and other matters pertaining to public health, including a sanitary survey. The field of public health is systematically covered in the fourth year by lectures and demonstrations by experts in association with the State Department of Health and City Bureau of Health and other specially invited lecturers and instructors.

Examination and Advancement of Students

Students are divided into four classes or grades which are designated as first, second, third and fourth year, according to the time spent in study and the marks attained. Oral, practical and written examinations are held for each class, not only at the end of each semester when the subject has been concluded, but at frequent intervals during the course. No student is advanced to a higher grade who has failed to pass in more than one major and one minor subject. He cannot be advanced even with these two conditions unless he has a satisfactory average in all other courses. All conditions must be passed before further promotion. No student is admitted to the third year class unless he has taken the preliminary New York state board examinations. No student is admitted to the fourth year class unless he has successfully passed the preliminary New York state board examinations.

First Year Major Subjects. Anatomy, physiology.

First Year Minor Subjects. Embryology, histology, organic chemistry, physiological chemistry.

Second Year Major Subjects. Pathology (including bacteriology, parasitology), pharmacology.

Second Year Minor Subjects. Anatomy, neuro-pathology, obstetrics, physical diagnosis, public health (laboratory).

Thrid Year Major Subjects. Medicine (including clinical pathology, contagious, gastro-enteric and mental diseases, pediatrics, physical diagnosis). Surgery (including orthopedics, roentgenology, surgical pathology, technic and minor surgery).

Third Year Minor Subjects. Dermatology, gynecology, neurology, obstetrics, ophthalmology and otology.

Fourth Year Major Subjects. Medicine (including contagious, gastro-enteric and mental diseases, pediatrics). Surgery (including genito-urinary surgery, orthopedics, roentgenology).

Fourth Year Minor Subjects. Dermatology, gynecology, laryngology and rhinology, neurology, obstetrics, ophthalmology and otology, public health.

Clinical Opportunities

Increased hospital facilities are assured in order to make sufficient clinical material available for approved methods of teaching clinical medicine.

Hospital Appointments

About the close of each school year vacancies occur in the house staffs of the hospitals in Albany, Troy and other cities. These are filled by medical school ranking or by competitive examinations which are open to members of the graduating class. Students are expected to take at least one year of service after graduation in a large general hospital. Last year ninety-six per cent. of the students in the graduating class obtained hospital appointments.

EXPENSES

The charge for tuition is \$160.00 (one hundred sixty dollars) a year, payable in advance, or if desired, in two installments, the first on or before September 27, 1916, the second on or before January 31, 1917. There are no extra charges except for the rental of microscopes, laboratory breakage and certain individual supplies. Tuition fees are payable at the Dean's office.

Every student is strongly urged to provide for himself a good compound microscope with oil-immersion lens. Such a microscope is not only necessary during the entire medical course but in actual practice after graduation. If a student is unable to secure such a microscope he may rent one, provided it is returned in good condition.

After the second year a standard blood counting apparatus, an instrument for hemoglobin estimation, a stethoscope and certain clinical supplies are recommended. For the laboratory work of the first two years, a dissecting set, slides, cover glasses and certain other inexpensive supplies are necessary. A list of these supplies, text and reference books will be given by the instructors at the first meeting of the courses.

Library

In 1893 the Medical School presented its library to the State of New York to form the nucleus of a large medical library which should be forever open to the students of the medical schools and in general to physicians throughout the State. The medical library is now unusually well housed and equipped in the new Education Building where every assistance and convenience is afforded to students. The entire library has 500,000 bound volumes and takes 8,800 current periodicals. The medical library possesses 19,000 bound volumes and receives 500 current periodicals. In addition to this library, each department has its own small working library of books and journals for ready reference.

DEPARTMENTS OF INSTRUCTION

The departments of instruction include the major branches of medicine and certain special subjects.

Anatomy

This department provides instruction in Histology, Embryology and Gross Anatomy. It co-operates with the departments of

Surgery, Medicine and Neurology in the teaching of surgical, topographical and nervous anatomy respectively.

Anatomy. The work in this department is practical and the instruction personal. The various tissues and organs of the human body are studied synchronously, so far as is possible, in the subdivisions of embryology, microscopical anatomy, and gross anatomy in order that the student may acquire a more comprehensive view and better correlated knowledge of the subject.

The laboratories are equipped for research work along descriptive and experimental lines. Research workers who will give half or the whole of their day will be welcomed and granted every facility.

Gross Anatomy. This subject is taught almost entirely by the dissection of the human cadaver.

The required work upon each part comprises (a) a dissection of the part, (b) a practical oral examination upon the completion of the part, (c) a written examination upon the completion of the part.

Microscopical Anatomy. Instruction in histology is given by means of lectures, demonstrations, class conferences, and practical work in the laboratory. The consideration of living and of fresh and unstained tissues precedes that of fixed and stained specimens. Practical instruction in the fixation, imbedding, cutting, and the vital-staining of tissues is given.

Embryology. Instruction in this subject is given by means of lectures, demonstrations upon models, class conferences, and laboratory work. The lectures cover the various features of mitosis, fertilization, cleavage, gastrulation, and the formation of the germ layers. Later, by coordination with the work in gross anatomy the various phenomena of histogenesis and of organogenesis are considered. The laboratory work consists of the study of stained serial sections and of the study of the larger embryological features by means of the binocular microscope.

Physiology

This department provides instruction in physiology, biological chemistry and pharmacology.

Physiology. The work in physiology is divided into laboratory work, lectures, recitations, special demonstrations, theses and written examinations. The course is given as far as possible in the form of laboratory work, and the laboratory has been recently equipped with new apparatus to accommodate forty students.

Biological Chemistry. The instruction in chemistry is arranged upon the assumption that the student is already thoroughly grounded in the principles of chemistry and physics. The object aimed at is to impart that fundamental knowledge of organic and physiological chemistry which is necessary to the comprehension of the bearings of chemistry upon physiology, pharmacology and medicine. The course is divided into two parts, organic and physiological chemistry.

Pharmacology. In this course, instruction is given by lectures, recitations, demonstrations and laboratory work. The first part of the work covers pharmacy and materia medica. The major part of the course covers experimental work illustrating the physiological action of a number of drugs.

Pathology

This department provides instruction in pathology, bacteriology, parasitology and certain phases of legal medicine.

The work in pathology and bacteriology is preceded by a brief explanatory talk, or followed by a lecture intended to correlate the various observations made during the day. The material received daily at the Bender Laboratory is used in the teaching and the student thus becomes familiar with laboratory routine. A small museum of gross pathological material is available and includes rare specimens. The autopsies performed during the course are viewed by small groups of men and the material carefully studied in gross and microscopically.

Medicine

This department provides instruction in internal medicine, physical diagnosis, pediatrics, dermatology, contagious, mental and gastro-enteric diseases, clinical pathology and public health.

Physical Diagnosis. Instruction in physical diagnosis is given to small groups. The section work in the last half of the second year includes the physical examination of normal infants, children and adults in preparation for the clinical work of the last two years. History taking is included in the course in physical diagnosis. In the third year, physical diagnosis is continued during the first semester. Various abnormal physical signs are studied as such and combined in relation to various diseases. For the course in physical diagnosis, the students examine one another and material is also available in the general and special hospitals and dispensaries.

Internal Medicine. Instruction in internal medicine is given in the third and fourth years. In the third year the student is engaged in practical individual work in the general dispensaries. Systematic didactic and clinical lectures in medicine are given during the third and fourth years. In the fourth year the students serve as assistants in the medical wards.

In the third year three didactic or clinical lectures a week are given. A course of lectures with demonstrations of apparatus for electro-therapeutics is given to the third year class once a week during the first semester. The course is supplemented in the fourth year by practical work with patients in the dispensary clinics under supervision.

In the fourth year, students are required to take at least three months medicine (4 hours a day) as assistants in the wards of the Samaritan Hospital, St. Peter's Hospital, the Albany Hospital and its tuberculosis department under direction. In this year four clinics and three clinical or didactic lectures are given.

Pediatrics. The course of study in children's diseases consists of didactic lectures; study of clinical cases in small groups; laboratory work; examination of milk, stools, etc.; study of case histories; recitations and practical work in connection with the infant welfare station.

The cities of Albany and Troy offer numerous opportunities for students for the study of diseases of children and infants, and also facilities to observe the medical inspection of school children and the operation of infant welfare stations.

Dermatology and Contagious Diseases. In the third year clinics and clinical lectures are given twice weekly at St. Peter's Hospital, and in the fourth year section work is given to groups of students three hours each week.

Didactic lectures in contagious diseases are given for the most part in the course in pediatrics. The practical individual instruction in contagious diseases is given in small sections during the third and fourth years.

Mental Diseases. Instruction is given to the senior class divided into sections. A syllabus in the form of a notebook with short psychological introduction is used as a guide. Opportunity is given to observe the progress of different cases from week to week.

Gastro-Enteric Diseases. The student is prepared for the course in digestive diseases by training in physiology and physiological chemistry. The third year course includes clinical lectures, demonstrations and recitations. A systematic course in digestive diseases is given to this class. The fourth year is mainly clinical.

Clinical Pathology. In this course a systematic study of the methods for examination of urine, blood, sputum, stomach contents, stool and body fluids is undertaken. Instruction is given by means of work in the laboratory, supplemented by brief lectures and outside reading.

Public Health. In the second year, following the course in pathology and bacteriology, work by the "concentration system" is given during the month of January in laboratory instruction in methods and experience in the examination of water, milk, air and other matters pertaining to public health, including sanitary surveys.

The field work includes both a sanitary survey of a given district by groups of students under direction and an insight into

the practical workings of the state laboratory for the production of antitoxin, vaccine, etc., of the city filtration plant and of the city health inspection, for the collection of milk samples, the suppression of nuisances, etc.

In the fourth year, a systematic and comprehensive course in public health and subjects directly and indirectly related, such as medical jurisprudence, sex hygiene, social service, etc., has been arranged.

Surgery

This department provides instruction in surgery, surgical pathology, orthopedics, roentgenology, genito-urinary surgery, ophthalmology, otology and diseases of the nose and throat.

Surgery. In the third year instruction is given in surgical pathology, surgical diagnosis, surgical technique, and section work in surgical dispensaries.

In the fourth year bed-side teaching is done, in which the senior students, in small groups, serve as assistants in the wards at the hospitals. Surgical clinics and recitations in surgery are also held.

Surgical Pathology and Surgical Diagnosis. Surgical pathology is taught throughout the third year. The essentials of histology and pathology and their relation to surgery are discussed before starting on general and special surgical pathology.

Surgical diagnosis is also given during the third year, and surgical history taking is one of the main topics of the course.

Surgical Technique and Minor Surgery. The course in surgical technic and minor surgery consists as far as possible of practical demonstrations, preceded by a brief synopsis of the development of modern surgical technic. Practical work is required of each student.

Orthopedics and Roentgenology. The course in orthopedic surgery is given in the wards of the Albany Hospital and the Child's Hospital.

For the course in roentgenology the Albany Medical College has at its disposal the Roentgen ray department of the Albany Hospital.

Genito-Urinary Surgery. In the fourth year instruction is given by section teaching in small groups by lectures, lantern slide demonstrations and clinics. The students have practical individual experience in the treatment of cases.

Ophthalmology and Otology. In the third year one lecture a week in ophthalmology is given for the first half of the year and a corresponding hour in the last half of the year is devoted to otology. The didactic work is illustrated by specimens and lantern demonstrations.

In the fourth year the class is divided into sections. Each student has one period a week for the entire year. Clinical lectures illustrate the methods of examining the patient, the external diseases of the eye, the use of the ophthalmoscope and its practical application, operations and general ophthalmology.

The student is taught the method of examining and treating the common ear diseases and is shown the ordinary and also the complicated ear operations, including personal instruction with patients.

Laryngology and Rhinology. In the fourth year one and a half hours a week will be devoted to teaching diseases of the nose and throat. This includes clinical lectures, section teaching and special methods of diagnosis.

Neurology

This department provides instruction in neurology, neuropathology and the anatomy of the nervous system.

Cases for neurological clinics are always easily obtained either from the general medical service and out-patient department of the Albany City Hospital, St. Peter's Hospital and the Child's Hospital, or from the Alms House and County Hospital. Occasionally, a clinic hour is utilized for a lantern slide demonstration of neurological conditions not encountered in the usual clinical display, there being for this purpose an exceptionally varied and interesting collection of pictures derived from the leading neurological clinics of Europe.

Gynecology

This department provides instruction in gynecology and obstetrics.

Gynecology. Gynecology is treated by a course of class room studies in which the various normal and abnormal conditions of the pelvic organs are presented to the students in the form of illustrated problems which they are asked to solve. The solution of these problems is supplemented by additional information necessary to complete the subject under discussion.

Obstetrics. Material for instruction is furnished by the Anthony N. Brady Maternity Home, the Albany Hospital and the Albany Guild for the Care of the Sick.

Investigation and Special Instruction

Opportunity for elective work and research is offered to those who are deemed qualified by those in charge of the various courses after conference with the heads of their respective departments. For graduate and summer courses and other special instructions, application should be made to the dean.

Course for Health Officers

The Albany Medical College offers an intensive course for Health Officers during the entire day, 9 A. M. to 6 P. M., in the month of January, 1916. This course combines field and laboratory work.

ALBANY LAW SCHOOL

This school is among the oldest institutions of the kind in the country, having been established in 1851, and its graduates number many of the most successful men in the profession. It is and has been largely represented in the executive, judicial and legislative departments of this and many other states, as well as of the federal government. It became a part of Union University in 1873, and begins its sixty-fourth year as a law school with the present scholastic year. During its long and successful career it has, in common with other law schools, done much to demonstrate what was at one time doubtful, but is now accepted almost as an axiom, that a course at the law school is a well-nigh necessary prerequisite to a successful professional career. Its instructors have always been men of repute and standing, both for professional learning and personal character.

The local advantages of the city of Albany, as the seat of a professional school, can not be overrated. It is the capital of one of the leading states in the Union, whose legislature is in session here for the third part of the year, presenting opportunities not afforded by any other law school in the state for observing the methods and procedure collectively of the executive, judicial and legislative departments of the state government. The knowledge thus obtained by the students at law, who are to complete their course and to enter the realm of public affairs, can not be overestimated. It is easily accessible, remarkably healthful, and the scene of great business and professional activity.

The facilities afforded the students for reading and study are unsurpassed. Besides the convenient and well chosen library of the school accessible to the students at all hours of the day and evening, the students have the privilege of using the state law library, which is now established in the New Education Building. With free access to these libraries the student may be relieved to a great extent from purchasing text-books.

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Torts, Liens and Practice Court

Hubbard Chair of Legal Ethics

The circulars of seventy of the leading law schools of the country show that a very few years ago only twenty of this number made the subject of legal ethics part of the curriculum. With two exceptions, those schools were either in the west or south. These facts led Gen. Thos. H. Hubbard, class of '60, to place at the disposal of the board of trustees the sum of \$10,000, the income to be applied to lectures upon this subject. The board of trustees decided to inaugurate the course at the opening of the school year of 1903 and twenty-six Lectures by as many distinguished judges and lawyers have been delivered up to this time.

CALENDAR

1915

Registration, first semester.....	Tuesday, September 21
Scholastic year begins.....	Wednesday, September 22
Election day recess.....	Friday, October 29
Lectures resumed.....	Wednesday, November 3
Thanksgiving recess begins, noon.....	Wednesday, November 24
Lectures resumed.....	Tuesday, November 30
Holiday recess begins, noon.....	Thursday, December 23

1916

Lectures resumed.....	Tuesday, January 4
Examinations....	Thursday, Friday and Saturday, January 27-29
McKinley day.....	Saturday, January 29
Registration, second semester.....	Tuesday, February 1
Lincoln's birthday.....	Saturday, February 12
Washington's birthday (Feb. 22), recess....	Tuesday, February 22
Easter recess begins, noon.....	Friday, April 21
Lectures resumed.....	Monday, May 1
Memorial day, recess.....	Tuesday, May 30
Examinations.....	Thursday, Friday and Saturday, June 1-3
Commencement.....	Thursday, June 8

REQUIREMENTS FOR ADMISSION AND GRADUATION

The course for graduation is now three years. Candidates for graduation from this school will be required (1) to present evidence of a general preliminary education representing at least four years, or their equivalent, of work of a grade above the elementary or grammar school before beginning the course of study; (2) to have studied law at least three full years for the degree of LL. B., each school year of which shall consist of not less than thirty-two school weeks, exclusive of vacations, in which not less than ten hours of attendance upon law lectures or recitations of such prescribed course to be given or conducted by regular members of the faculty are required in each week, unless admitted to advanced standing of one year on graduation from a registered college or university; (3) to complete the course in residence of not less than one year; (4) to be of good moral character; (5) to be at least twenty-one years of age.

EXPENSES

Matriculation fee, on entrance.....	\$10
Tuition, each year.....	110
Graduation fee	10

For catalogues or further information address

JOHN C. WATSON, *Registrar*

Albany Law School,

Albany, N. Y.

THE DUDLEY OBSERVATORY

The Dudley Observatory is devoted to original research in astronomy, according to the purpose of its founder and successive patrons. Its contributions to science are represented in two volumes of *Annals* and in other published volumes and memoirs contained in the transactions of learned societies and astronomical journals. Its principal line of work at present is the determination of problems relating to the positions and motions of the stars and of the solar system as a whole.

The instrumental equipment of the observatory is designed for the purposes of exact measurement. In the tower of the main building is the Pruyn equatorial, with object-glass twelve inches in diameter. This instrument is equipped for both visual and photographic use, and is of a high order of mechanical perfection. The Olcott meridian circle is located in a separate building, especially designed for securing the utmost equality in the temperature between the external air and that in the building itself. Its object-glass is eight inches in diameter. It was made by Pistor and Martins, of Berlin, and is regarded by astronomers as a masterpiece of accurate workmanship. This instrument has been employed for many years in obtaining the measurements necessary for the construction of the numerous and elaborate star catalogues which have issued from the Dudley Observatory. In addition to these instruments, the observatory is in possession of various small telescopes, clocks, chronographs and smaller apparatus.

The institution is supported by an endowment, chiefly contributed by Mrs. Blandina Dudley, the late Catharine W. Bruce, and Hon. Frederic P. Olcott, as well as by appropriations which have been received from the National Academy of Sciences, and from current contributions of trustees and friends of the institution. Since 1902, annual grants have been made to the director of the observatory by the Carnegie Institution of Washington. These have been sufficient to provide for the entire force of assistants and computers now employed. In 1905, the Carnegie Institution made

special provision for carrying on the star researches upon which the observatory is engaged. This includes an appropriation which enabled the observatory to send the Olcott meridian circle to the southern hemisphere for two years with an ample force of observers, in order to carry out an essential feature of its investigations.

The Dudley Observatory is not designed to give general instruction in astronomy, though special students contemplating instruction in professional lines are received under an arrangement of computing service to the observatory.

The observatory is opened to visitors on Tuesday evening.

For further particulars apply to

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ALBANY COLLEGE OF PHARMACY

The Albany College of Pharmacy was created by act of the board of governors of Union University, June 21, 1881, and constitutes the department of pharmacy of Union University. It was incorporated as the Albany College of Pharmacy, August 27, 1881. The college is centrally located at 43-45 Eagle street.

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Instructor in Pharmacy and Mathematics

LE ROY GEORGE MATHEWS, PH. G.

Instructor in Physics

CLARENCE EDMOND MULLENS, M. D.

Lecturer in Physiology

CALENDAR FOR 1915-1916

1915

Opening exercises.....	Monday, September 27
Conditions examinations.....	Friday, September 24
Christmas vacation, begins.....	Monday, December 20

1916

Exercises resumed.....Monday, January 3
Commencement.....Tuesday, April 25

REQUIREMENTS FOR ADMISSION

All applicants for admission to regular standing in this college must be at least seventeen years of age, and will be required to present a Pharmacy Student Certificate issued by the New York State Education Department. The requirement for this certificate is the completion of the first year's course in a recognized high school or academy, or evidence of an equivalent education. Inquiries concerning this preliminary requirement may be addressed to the New York State Education Department, Albany, New York.

CURRICULUM

The curriculum of the college embraces:

Chemistry—Theoretical, general, pharmaceutical and analytical

Botany—Structural, systematic and analytical

Materia Medica and Pharmacognosy

Pharmacy—Theoretical and Practical

Microscopy—Theoretical and practical in its relation to pharmacy

Toxicology

Pharmaceutical Mathematics

Physics

Physiology

Latin

Pharmaceutical Jurisprudence

Commercial Pharmacy

GRADUATION

The diploma of this college confers the degree of Graduate in Pharmacy (Ph. G.). Applicants for this degree must have had the required preliminary education, be of good moral character, have attended two full courses in this college, or the last course in this college and the first in some other registered college of pharmacy; have passed satisfactory examinations and paid all fees as hereafter stated.

FEES FOR TUITION**EACH YEAR**

Matriculation	\$5 00
Tuition	90 00

SITUATIONS

Students desirous of obtaining employment while attending college will be assisted as far as possible in securing situations, but employment cannot be promised in advance, and places cannot be secured by correspondence. Personal application for employment always brings the best results. During the past several years the faculty has had a much larger number of openings offered for graduates to lucrative positions than it has been able to fill. The demand on the part of the employers for skilled assistants is steadily increasing, and a college diploma or license from an examining board is demanded by law of those who engage in the practice of pharmacy in most of the states and cities of the Union.

For separate catalogue giving more complete information address

ALFRED B. HUÉSTED, *Secretary*
43-45 Eagle street
Albany, N. Y.

ENROLLMENT, UNION UNIVERSITY, 1915-16

STUDENTS OF UNION COLLEGE

Abbreviations

cl, A. B. course; *ls*, Ph. B. course; *sc*, B. S. course; *en*, B. E. underclass course in general engineering; *ce*, B. E. course in civil engineering; *ee*, B. E. course in electrical engineering; N. S., North Section; M. S., Middle Section; S. S., South Section; N. C., North College; S. C., South College; O. G., "Old Gym" Dormitory.

An asterisk (*) before a student's name indicates that he has not been advanced in standing with his class.

Candidates for the Degree of Master of Arts or Master of Science

Roy E. Abbey, B. S.....	<i>Schenectady</i>
Michael William Bray, A. B.....	<i>Utica</i>
Harold E. Blodgett, Ph. B.....	<i>Schenectady</i>
Maurice R. Brown, B. S.....	<i>Amsterdam</i>
Samuel M. Cavert, A. B.....	<i>New York City</i>
Harry Lee Davenport, B. S.....	<i>Schenectady</i>
George M. Elmendorf, Ph. B.....	<i>Herkimer</i>
David Roy Finley, A. B.....	<i>Schenectady</i>
Paul J. Hagar, A. B.....	<i>Jersey City, N. J.</i>
William A. Hughes, B. S.....	<i>Schenectady</i>
Edward B. Irish, A. B.....	<i>Fultonville</i>
Arthur L. Maxon, A. B.....	<i>Schenectady</i>
Roy H. McCormack, A. B.....	<i>Cincinnati</i>
Fred F. McGauley, B. S.....	<i>Schenectady</i>
Floyd Leslie Miller, Ph. B.....	<i>Schenectady</i>
Frank Stanley Randles, B. S.....	<i>Argyle</i>
Ross Williams Tiffany, B. S.....	<i>Newburgh</i>
Harry G. Van Deusen, A. B.....	<i>Sayre, Pa.</i>
Warren Chase Vosburgh, B. S.....	<i>Schenectady</i>

Charles N. Waldron, B. S.....*Schenectady*
 Kenneth B. Walser, A. B.....*New York City*
 Roy Cameron Whitney, B. S.....*Oswego*

Candidates for the Degree of Master of Civil Engineering

Harold W. Baker, B. E.....*Oneida*
 Tulloch McC. Townsend, B. E.....*Schenectady*

Graduate Students in Civil Engineering

Stephen B. Story, B. E.....*Schenectady*

Graduate Students in Electrical Engineering

Ernst F. W. Alexanderson, M. E...*Royal Tech. Inst.*.....*Sweden*
 Candidate for the degree of Doctor of Philosophy
 Louis DuB. De La Vergne, M.S. in E.E..*Union College*.....*Kingston*
 Candidate for the degree of Doctor of Philosophy
 Olin J. Ferguson, M. E. E.....*Univ. of Nebraska*..Lincoln, Neb.
 Candidate for the degree of Doctor of Philosophy
 Wilbert A. Garrison, A. M.....*Harvard University*..Schenectady
 Candidate for the degree of Doctor of Philosophy
 Morland King, M. E. E.....*Union College*.....Schenectady
 Candidate for the degree of Doctor of Philosophy
 Albert J. Salathe, A. M.....*Colgate University*...Schenectady
 Candidate for the degree of Doctor of Philosophy
 Alex. R. Stevenson, Jr., M. S. in E. E..*Princeton University*.Schenectady
 Candidate for the degree of Doctor of Philosophy
 Walter L. Upson, M. E. E.....*Princeton University*.Schenectady
 Candidate for the degree of Doctor of Philosophy
 John N. Vedder, A. M., A. M.....*Union College*.....Schenectady
 Candidate for the degree of Doctor of Philosophy
 Jeshine Zee, M. S.....*Mass. In. of Tech.*.Shanghai, China
 Candidate for the degree of Doctor of Philosophy
 Delwyn Dessar, B. S.....*University of Nevada*.Schenectady
 Candidate for the degree of Master of Science in Electrical Engineering
 Nelson Dingley, III.....*Kalamazoo College*.. Schenectady
 Not candidate for a degree
 Kenichiro Kazaska.....*Imp. University of Tokio*...Japan
 Candidate for the degree of Master of Science in Electrical Engineering

- Wallace Bryant Kirke, Ph. B.....*Yale University*...St. Paul, Minn.
Candidate for the degree of Master of Science in Electrical Engineering
- Ying-chiun Lo.....*Cornell University*.....China
Candidate for the degree of Master of Science in Electrical Engineering
- Edmond W. Moore, B. S.....*Univ. of Rochester*....Rochester
Candidate for the degree of Master of Science in Electrical Engineering

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- sc* Harlan Barrett Allen.....*Lowville*.....750 Nott St.
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- ls* Charles Foster Brown.....*Schenectady*.....K A Lodge
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- ee* Walter Allen Churchill.....*Oswego*.....Σ Φ Place
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- ee* Peter J. M. Clute.....*Schenectady*.....801 Strong St.
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- ee* Carl Frederick Danner.....*East Aurora*.....B Θ Π House
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- *ce* George Edward De Rouville....*Albany*.....Δ T House
- ee* Harry Clifford Dikeman.....*Freeport*.....Ψ T House
- sc* Revington Lyman Embree.....*Stamford, Ct.*.....Silliman Hall
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Seniors—62

Juniors, Class of 1917

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<i>cl</i>	Allison Susholz Behr.....	<i>Amsterdam</i>	32 No. Wendell Ave.

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<i>ce</i>	Edward Carpenter Brandow....	<i>Albany</i>	Δ T House
<i>sc</i>	Irwin Alfred Buell.....	<i>Northampton</i>	Silliman Hall
<i>ee</i>	Clarence Jerome Bull.....	<i>Mamaroneck</i>	Ψ T House
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<i>cl</i>	David Ferdinand Chapman....	<i>Broadalbin</i>	Δ Φ House
<i>ee</i>	Robert Henry Clapp.....	<i>Fairport</i>	739 Nott St.
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<i>sc</i>	Isaac William Clements.....	<i>Fort Ann</i>	Pyramid Club
<i>cl</i>	Wilson Ober Clough.....	<i>Schenectady</i>	Silliman Hall
<i>ce</i>	Stephen Joseph Costello.....	<i>Schenectady</i>	706 South Ave.
<i>ee</i>	Harry Hurlbut Dibble.....	<i>Ushers</i>	Pyramid Club
<i>sc</i>	Philip Windsor Downs.....	<i>Omaha, Neb.</i>	X Ψ Lodge
<i>ee</i>	Lloyd Elmer Dunkelberger....	<i>Lockport</i>	Δ X A House
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<i>ee</i>	Floyd Field Eldred.....	<i>Auburn</i>	Ψ T House
<i>sc</i>	Frank Russell Elmore.....	<i>Middletown</i>	B Θ Π House
* <i>ee</i>	Anson Ainsworth Emmerling..	<i>Albany</i>	Φ Γ Δ House
* <i>ce</i>	James Harold England.....	<i>Albany</i>	25 Kent St., Albany
<i>ee</i>	Christopher Canning Farrell...	<i>Arlington, R. I.</i>	Pyramid Club
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* <i>ce</i>	Willett William Friday.....	<i>Schenectady</i> ...	25 Parkwood Blvd.
* <i>ce</i>	George Rae Galbraith.....	<i>Rochester</i>	Φ Γ Δ House
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<i>ls</i>	Jacob William Gauger.....	<i>Albany</i>	Δ Φ House
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<i>sc</i>	Orra Frost Hawn.....	<i>Ravena</i>	Φ Δ Θ House
<i>ee</i>	Russell Hemphill.....	<i>Westerly, R. I.</i>	Δ T House
<i>ee</i>	Charles Manser Hendry.....	<i>Rye</i>	Δ X A House
<i>ee</i>	Henry Walter Hochuli.....	<i>Schenectady</i>	1471 State St.
<i>ee</i>	Arnold Hooper.....	<i>Albany</i>	X Ψ Lodge

<i>sc</i>	Earl Myron Hyatt.....	<i>Newburgh</i>	706 Eastern Ave.
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<i>ls</i>	John Wagner Jackson.....	<i>Fort Plain</i>	Φ Γ Δ House
<i>ee</i>	Merwyn James Jamieson.....	<i>Stark</i>	B Θ Π House
<i>*ee</i>	Anthony John Janulis.....	<i>Amsterdam</i>	S. S. N. C.
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<i>ee</i>	Emmons Nathan Jenkins.....	<i>Griffin Corners</i>	739 Nott St.
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<i>ce</i>	Harry Russell Kirkup.....	<i>Bay Shore</i>	K Α Lodge
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<i>sc</i>	Charles Albert Lewis.....	<i>Troy</i>	1 No. Church St.
<i>ce</i>	William Cahill Loughlin.....	<i>Fort Edward</i>	Φ Γ Δ House
<i>ee</i>	Rufus Victor Maier.....	<i>Schenectady</i>	1318 State St.
<i>sc</i>	Ernest Wyckoff Mandeville....	<i>Elmira</i>	Ψ Τ House
<i>sc</i>	Louis Mann.....	<i>New York City</i>	Δ Τ House
<i>ce</i>	Allen Mattison.....	<i>South Berlin</i>	Α Χ Α House
<i>sc</i>	John Francis McDermott.....	<i>Schenectady</i>	129 Park Pl.
<i>ce</i>	Ashley Clinton Mead.....	<i>Scotia</i>	22 Ballston Ave., Scotia
<i>ce</i>	James Floyd Miller.....	<i>Albany</i>	B Θ Π House
<i>sc</i>	Ralph Gleason Morison.....	<i>Little Britain</i>	Φ Δ Θ House
<i>ee</i>	Raymond Everett Moses.....	<i>Brackney, Pa.</i>	22 Barrett St.
<i>ee</i>	George Eldred Moston.....	<i>North Creek</i>	Φ Δ Θ House
<i>ee</i>	Armando da Souza Mursa.....	<i>Sao Paulo, Brazil</i>	N. S. S. C.
<i>ce</i>	Gordon Clifford Nash.....	<i>Mt. Kisco</i>	S. S. N. C.
<i>ee</i>	Milton McCowan Newell.....	<i>El Paso, Texas</i>	834 Union St.
<i>ee</i>	Hall Brainard D. Passage.....	<i>Schenectady</i>	244 McClellan St.
<i>sc</i>	Fawcett William Porter.....	<i>Omaha, Neb</i>	X Ψ Lodge
<i>ce</i>	Don P. Price.....	<i>Hancock</i>	238 Green St.
<i>ce</i>	Herbert Spencer Roberts.....	<i>Scotia</i>	38 Ballston Ave., Scotia
<i>ee</i>	Thomas Carter Rogers.....	<i>Atlanta, Ga.</i>	118 Van Vranken Av.
<i>ls</i>	Raymond Howard Rollins.....	<i>Kennebunkport, Me.</i>	Pyramid Club
<i>ce</i>	Wilfred Masten Rosekrans.....	<i>Schenectady</i>	36 Wendell Ave.

<i>ls</i>	Albert Salisbury.....	<i>Deposit</i>	27 Waverly Pl.
<i>sc</i>	Harold Leonard Sammons.....	<i>Ogdensburg</i>	B Θ II House
<i>ee</i>	William Schauer.....	<i>Altoona, Pa.</i>	530 Christler Ave.
<i>ee</i>	James McPherson Schmidt.....	<i>Hurley</i>	16 Wendell Ave.
<i>ls</i>	Rudolph William Schwartz.....	<i>Albany</i>	37 Glenwood Blvd.
<i>ce</i>	Hal Arch Scoby.....	<i>North Tonawanda</i> ..	B Θ II House
<i>*ee</i>	James Kyle Sexson.....	<i>Franklin, Neb.</i>	Pyramid Club
<i>ce</i>	Tracy Hazard Sherman.....	<i>Nyack</i>	168 Nott Terrace
<i>sc</i>	Homer L. Stephens.....	<i>Gardner</i>	Pyramid Club
<i>sc</i>	Guy Joseph Tanzer.....	<i>Amsterdam</i>	Pyramid Club
<i>*cl</i>	David Merlin Taylor.....	<i>Lanesboro, Pa.</i>	5 Gillespie St.
<i>ee</i>	Otto Christian Thuener.....	<i>Schenectady</i>	R. F. D. No. 7
<i>cl</i>	John Hider Tregurtha.....	<i>Schenectady</i> ...	37 Parkwood Blvd.
<i>ee</i>	Cecil Harley Underwood.....	<i>Schenectady</i>	202 Wright Ave.
<i>ee</i>	John Winters Upp, Jr.....	<i>Schenectady</i>	40 Wendell Ave.
<i>sc</i>	Forest Baldwin Van Avery.....	<i>Schenectady</i>	3 Haigh Ave.
<i>ee</i>	Antonio dos Santos Vianna.....	<i>Rio de Janeiro, Braz.</i>	20 Romeyn St.
<i>*ee</i>	Edward Clifford Vrooman.....	<i>Schenectady</i>	207 Union St.
<i>sc</i>	George Hugh Wallace.....	<i>Port Jefferson</i>	Pyramid Club
<i>ce</i>	Leon J. Walrath.....	<i>St. Johnsville</i>	Δ Υ House
<i>ee</i>	Arnold Noble Weeks.....	<i>Ticonderoga</i>	Φ Γ Δ House
<i>ce</i>	Samuel Noble Wheeler, Jr....	<i>Hancock</i>	S. S. N. C.
<i>sc</i>	Hugh J. Williams.....	<i>Elmhurst, Pa.</i>	City Y. M. C. A.
<i>ce</i>	Andrew Douglas Wilson.....	<i>Schenectady</i>	321 Crane St.

Juniors—103.

Sophomores, Class of 1918

<i>*en</i>	James Nelson Aken.....	<i>Philmont</i>	Δ Υ House
<i>sc</i>	Benton Fremont Allen.....	<i>Lowville</i> ...133	Van Vranken Ave.
<i>sc</i>	Clarence O. Anderson.....	<i>Brookline, Mass.</i> ...	11 Barrett St.
<i>ls</i>	Lewis Mann Anker.....	<i>Albany</i>	37 Glenwood Blvd.
<i>en</i>	Le Roy Bailey.....	<i>Ballston Lake</i>	B Θ II House
<i>cl</i>	Frederick George Bascom.....	<i>Fort Edward</i>	K Α Lodge
<i>*sc</i>	John J. Beattie.....	<i>Salem</i>	Δ Φ Lodge
<i>sc</i>	Guy Hamilton Beckett.....	<i>Omaha, Neb.</i>	X Ψ Lodge
<i>sc</i>	John Frederick Behnken.....	<i>Jeffersonville</i> ..	543 Brandywine Av.
<i>en</i>	William Thomas Birdsall.....	<i>Walden</i>	Φ Δ Θ House
<i>en</i>	Charles Calvin Bowman, Jr....	<i>Pittston, Pa.</i>	A Δ Φ House

<i>en</i>	James Herschel Bresee.....	<i>Gloversville</i>	243 Union St.
<i>en</i>	Charles Seymour Brignall.....	<i>Schenectady</i>	1309 Union St.
<i>sc</i>	Almond Crandall Brockway....	<i>Richfield Springs</i>	Δ Υ House
<i>en</i>	John David Brown.....	<i>Bridgeport, Ct.</i>	K Α Lodge
<i>cl</i>	L. Prescott Brown.....	<i>Mt. Kisco</i>	K Α Lodge
<i>en</i>	Harry Ames Calkins.....	<i>Cohoes</i>	B Θ Π House
<i>cl</i>	Edward Madison Cameron, Jr..	<i>Albany</i>	Δ Φ House
<i>en</i>	Willis Robert Cantrell.....	<i>New York City</i>	705 Nott St.
<i>sc</i>	W. Gibson Carey, Jr.....	<i>Schenectady</i>	4 Ardsley Rd.
<i>en</i>	Dean David Chapleau.....	<i>Ticonderoga</i>	Pyramid Club
<i>en</i>	Henry Anable Clarke.....	<i>Williamsport, Pa.</i>	O. G.
<i>cl</i>	Harold Lewis Cook.....	<i>Auburn</i>	Ψ Υ House
<i>en</i>	Donald Jay Coon.....	<i>Fairport</i>	161½ Nott Terrace
<i>en</i>	Eugene George Crippen.....	<i>Schenectady</i>	R. F. D. No. 7
<i>en</i>	Philip Smith Dorlon, Jr.....	<i>Troy</i>	Δ Φ House
<i>en</i>	Albert Wynkoop Du Bois.....	<i>Athens</i>	Ψ Υ House
<i>cl</i>	Harold Leo Dunn.....	<i>Schenectady</i>	818 State St.
<i>cl</i>	Spencer Brownell Eddy.....	<i>Saratoga Springs</i>	Α Δ Φ House
<i>en</i>	Wendell John Erickson.....	<i>Schenectady</i>	7 Columbia St.
<i>en</i>	Wendell George Fallis.....	<i>Gloversville</i>	605 Union St.
<i>en</i>	George Harold Fancher.....	<i>Schenectady</i>	231 Union St.
<i>en</i>	Fred William Fisch.....	<i>Schenectady</i>	118 Van Vranken Av.
* <i>sc</i>	Porter Graham Fisher.....	<i>Buffalo</i>	Α Δ Φ House
<i>en</i>	Leonard Harrison Frasier.....	<i>Amsterdam</i>	Φ Γ Δ House
* <i>en</i>	George Laverack Frisbee.....	<i>Hamburg</i>	B Θ Π House
<i>en</i>	David Gardenier	<i>Chatham</i>	Δ Υ House
<i>en</i>	Raymond Scott Glenn.....	<i>Scotia</i>	221 Catherine St., Scotia
<i>en</i>	Bruce Alexander Hainsworth..	<i>Gloversville</i>	North Colonnade
<i>en</i>	Benjamin Frank Hance.....	<i>Fairport</i>	111 Nott Terrace
<i>en</i>	Thomas Claire Hance.....	<i>Fairport</i>	111 Nott Terrace
<i>en</i>	Harold Asahel Hawley.....	<i>Waterford</i>	Σ Φ Place
<i>en</i>	Harold Harvey Hay.....	<i>Holyoke, Mass.</i>	817 State St.
<i>ls</i>	Clyde Alexander Heatly.....	<i>Schenectady</i>	20 Waverly Pl.
<i>sc</i>	Pierre Hoag	<i>Schenectady</i>	Σ Φ Place
<i>sc</i>	Walter Hochuli	<i>Schenectady</i>	1471 State St.
<i>en</i>	Elmer Newton Howard.....	<i>E. Northfield, Mass.</i>	Pyramid Club
<i>en</i>	James Edwin Hulshizer, Jr....	<i>Bernardsville, N. J.</i>	X Ψ Lodge
<i>en</i>	Harold Forbell Hyatt.....	<i>Jamaica</i>	Ψ Υ House

<i>en</i>	Herbert Leigh Jaycox.....	<i>Beacon</i>	Φ Γ Δ House
<i>sc</i>	August John, Jr.....	<i>Schenectady</i>	113 So. Ferry St.
<i>ls</i>	Wesley Decius Karker.....	<i>Schenectady</i>	1216 Albany St.
<i>cl</i>	William Logan Kennedy, Jr....	<i>New York City</i>	Δ T House
<i>cl</i>	Marvin Irving King.....	<i>Schenectady</i>	237 Union St.
<i>sc</i>	Clarence Henry Krusie.....	<i>Schenectady</i>	209 Avenue A
<i>en</i>	Herman Lefkowitz	<i>Rochester</i>	M. S. S. C.
<i>en</i>	Ko Gye Leong.....	<i>Rangoon, Burma, Ind.</i>	105 Sew'd Pl.
<i>sc</i>	Bernadotte Perrin Lester.....	<i>Saratoga Springs</i>	A Δ Φ House
<i>en</i>	Alwyn Gordon Levy.....	<i>Brooklyn</i>	S. S. S. C.
<i>en</i>	Thomas Leo Madden.....	<i>Clyde</i>	70 Bedford Rd.
<i>*en</i>	Egbert Lowe Marks.....	<i>Niskayuna</i>	Niskayuna
<i>en</i>	William Herman Matern.....	<i>Gloversville</i>	North Colonnade
<i>*en</i>	Ezekiel McCleary.....	<i>Amsterdam</i>	304 Locust A., Am'dam
<i>cl</i>	Jasper Ernest McIntyre.....	<i>West Albany</i>	Stop 20½ Albany Rd.
<i>ls</i>	Traver McKenna	<i>Albany</i>	Δ X A House
<i>en</i>	Mark Felton McLean.....	<i>Jamaica, Vt.</i>	Pyramid Club
<i>en</i>	Harold Allen Mills.....	<i>Gloversville</i>	Δ X A House
<i>en</i>	Humberto Monteiro da Cunha..	<i>Sao Paulo, Brazil</i>	S. S. S. C.
<i>en</i>	John Merton Moore.....	<i>Northville</i>	Pyramid Club
<i>*en</i>	Mantin Edward Morris.....	<i>Schenectady</i>	47 Glenwood Blvd.
<i>sc</i>	George Franklin Mosher.....	<i>Northville</i>	Pyramid Club
<i>sc</i>	Frank D. Moynihan.....	<i>Fort Edward</i>	11 Barrett St.
<i>sc</i>	James Bragdon Mudge.....	<i>Schenectady</i>	233 Liberty St.
<i>sc</i>	Raymond F. Neuhaus.....	<i>Schenectady</i>	824 Lincoln Ave.
<i>en</i>	Earl Lester Newell.....	<i>East Aurora</i>	B Θ II House
<i>en</i>	Arthur Hempstead Newman....	<i>Bridge Hampton</i>	O. G.
<i>sc</i>	William Pierre Northrop.....	<i>Newburgh</i>	Φ Δ Θ House
<i>en</i>	James Frank Peaslee.....	<i>East Springfield</i>	Φ Δ Θ House
<i>en</i>	Ruy Pinheiro	<i>Campinas, Brazil</i>	N. S. S. S.
<i>ls</i>	Mathias Philip Poersch.....	<i>Schenectady</i>	353 Hulett St.
<i>sc</i>	James La Vern Pollock.....	<i>Sprakers</i>	11 Barrett St.
<i>*en</i>	Floyd Egbert Reeves.....	<i>Watertown</i>	Δ T House
<i>en</i>	Andrew Kidd Reid.....	<i>Schenectady</i>	30 Wendell Ave.
<i>sc</i>	Dow Geesler Roof.....	<i>Canastota</i>	Φ Γ Δ House
<i>en</i>	Harold Percival Rounds.....	<i>Dexter</i>	Pyramid Club
<i>en</i>	Edwin Augustus Schabbehar...	<i>Rockville Centre</i>	Δ X A House
<i>sc</i>	Francis William Schnitzlein...	<i>Fort Plain</i>	104 Jay St

<i>sc</i>	Roy Augustus Schuyler.....	<i>Pattersonville</i>	Φ Γ Δ House
<i>sc</i>	Hyman W. Sevitz.....	<i>Schenectady</i>	606 Terrace Pl.
<i>en</i>	Ernest Randolph Slade.....	<i>Gloversville</i>	North Colonnade
<i>ls</i>	Leo Henry Smith.....	<i>Warrensburgh</i>	20 Barrett St.
<i>en</i>	Louie Spraragen	<i>Warwick</i>	827 Albany St.
<i>cl</i>	Ignatz Russell Stein.....	<i>Schenectady</i> ...	38 Glenwood Blvd.
<i>sc</i>	John Barnaby Still.....	<i>Brooklyn, Pa.</i> ...	144 Nott Terrace
<i>en</i>	Kenneth William Stillman.....	<i>Argyle</i>	Pyramid Club
<i>en</i>	Fred Leland Kasson Swart.....	<i>Auburn</i>	1007 Nott St.
<i>sc</i>	Winfield Quenten Swart.....	<i>Schenectady</i>	33 Regent St.
<i>sc</i>	Sidney Wells Talbot.....	<i>Schenectady</i>	Ψ T House
<i>sc</i>	John Arthur Taylor.....	<i>Schenectady</i> ...	138 Van Vranken Av.
<i>en</i>	Carl John Tell.....	<i>Milwaukee, Wis.</i>	Σ Φ Place
<i>sc</i>	Hunter Adaline Towne.....	<i>Duluth, Minn.</i>	Δ Φ House
<i>ls</i>	Ralph Sylvester Travis.....	<i>Hale Eddy</i>	Pyramid Club
<i>en</i>	Leslie Samuel Uphoff.....	<i>Schenectady</i>	120 Avenue B
<i>cl</i>	Beverly Leland Vosburgh.....	<i>Johnstown</i>	9 State St.
<i>en</i>	Victor Ainslie Wynne.....	<i>Albany</i>	N. S. S. C.
* <i>sc</i>	Edwin Willard Yordon.....	<i>Fort Plain</i>	X Ψ Lodge
<i>cl</i>	John Charles Younie.....	<i>Schenectady</i>	26 Nott Terrace
<i>en</i>	Max Zuckerman	<i>Gloversville</i>	705 Nott St.

Sophomores—108.

Freshmen, Class of 1919

<i>sc</i>	George Albert Abbe.....	<i>Schenectady</i>	1105 Union St.
<i>sc</i>	Walter Livingston Alexander..	<i>Schenectady</i>	308 Summit Ave.
<i>pm</i>	Robert Matthews Andrews.....	<i>Guilderland</i>	1333 State St.
<i>en</i>	Fred Irving Arany.....	<i>Schenectady</i>	858 Emmett St.
<i>sc</i>	William Bright Ashton.....	<i>Yonkers</i>	Ψ T House
<i>en</i>	Pascual Mariana Avila.....	<i>Rio Cuarto, Argentina</i> ..	Pyra. Club
<i>pm</i>	Adams Bailey	<i>Mechanicsville</i>	Φ Γ Δ House
<i>sc</i>	Harold Randolph Baird.....	<i>Amsterdam</i> ...	11 Carmichael St., Am.
<i>en</i>	William Russell Barnett.....	<i>Newburgh</i>	O. G.
<i>en</i>	Charles Edgar Barrett.....	<i>Galway</i>	135 Van Vranken Ave.
<i>en</i>	John Rillman Bartholomew....	<i>Schenectady</i>	9 Adams Rd.
<i>sc</i>	Roger Romaine Beardsley.....	<i>Buffalo</i>	135 Van Vranken Ave.
<i>sc</i>	Edward Henry Beaver.....	<i>Schenectady</i>	310 Victory Ave.
<i>en</i>	Andrew Becker, Jr.....	<i>Fleischmanns</i>	739 Nott St.

<i>en</i>	Roger Edward Beckwith.....	<i>Unionville, Ct...</i>	103 Nott Terrace
<i>en</i>	Russell Edwin Bellinger.....	<i>Herkimer..</i>	133 Van Vranken Ave.
<i>cl</i>	John Alden Bennett.....	<i>Montclair, N. J.....</i>	A Δ Φ House
<i>pm</i>	George Henry Blais.....	<i>Cohoes.....</i>	75 Grant St., Cohoes
<i>sc</i>	Burroughs Rudolph Blakeslee.....	<i>Arkville.....</i>	642 Terrace Pl.
<i>en</i>	Law W. Bowman.....	<i>Pittston, Pa.....</i>	A Δ Φ House
<i>cl</i>	Charles Albert Brind, Jr.....	<i>Albany.....</i>	N. S. S. C.
<i>sc</i>	Henry Hilliard Brown.....	<i>Schenectady.....</i>	1218 Union St.
<i>en</i>	James Boyd Bunyan.....	<i>Ballston.....</i>	O. G.
<i>pm</i>	Douglas Anderson Calhoun....	<i>Watervliet.....</i>	35 Wendell Ave.
<i>en</i>	Francis John Campbell.....	<i>Schenectady..</i>	139 Parkwood Blvd.
<i>pm</i>	James Jerome Carey.....	<i>Troy.....</i>	1461 State St.
<i>sc</i>	Forrest Edwin Carr.....	<i>Richmondville.....</i>	103 James St.
<i>en</i>	Edward Spencer Cassedy.....	<i>Gloversville.....</i>	B Θ Π House
<i>pm</i>	Edward Joseph Christie.....	<i>Watervliet..</i>	1287 B'way, Watervliet
<i>en</i>	Ernest Christman	<i>Johnstown..</i>	422 Brandywine Ave.
<i>en</i>	James Howard Clark.....	<i>Sidney.....</i>	Δ T House
<i>en</i>	Ralph Sebring Clark.....	<i>Kalamazoo, Mich.....</i>	Δ Φ House
<i>sc</i>	Robert Cameron Cockburn....	<i>Watervliet....</i>	308 Schenectady St.
<i>pm</i>	Alfredo Gustavo Conte.....	<i>Schenectady.....</i>	244 Park Pl.
<i>pm</i>	Joseph Cornell	<i>Scotia.....</i>	67 Douglas St. Scotia
<i>en</i>	Charles Edmiston Craven, Jr..	<i>Mattituck.....</i>	O. G.
<i>en</i>	William George Croucher.....	<i>Newark.....</i>	B Θ Π House
<i>en</i>	Leonard Thomas Cunningham.	<i>Schenectady.....</i>	1103 State St.
<i>en</i>	Wilfred Dalton	<i>Schenectady.....</i>	A Δ Φ House
<i>en</i>	James Ferdinand Davidson....	<i>Oshkosh, Wis.....</i>	Φ Γ Δ House
<i>cl</i>	Samuel Elmer Davis, Jr.....	<i>Schenectady..</i>	Stop 14, Albany Rd.
<i>en</i>	Harvey Leander Day.....	<i>Lowville..</i>	133 Van Vranken Ave.
<i>en</i>	Charles Jewell De Laplante....	<i>Buffalo.....</i>	A Δ Φ House
<i>sc</i>	Charles De La Vergne.....	<i>Kingston.....</i>	A Δ Φ House
<i>en</i>	Ralph Marston De Rose.....	<i>Gloversville.....</i>	North Colonnade
<i>sc</i>	Richard Joseph Donovan.....	<i>New Rochelle.....</i>	O. G.
<i>cl</i>	Arthur Buckingham Dougall..	<i>Schenectady.....</i>	1103 Union St.
<i>en</i>	Simon Etkin	<i>Schenectady....</i>	538 So. Centre St.
<i>sc</i>	Robert Roy Faust.....	<i>Schenectady.....</i>	19 Jay St.
<i>en</i>	Arthur Thomas Flood.....	<i>Hudson Falls.....</i>	Ψ T House
<i>en</i>	Glenn Lamont Forrest.....	<i>Cold Brook.....</i>	849 Union St.
<i>en</i>	Leo Laurence Frees.....	<i>Schenectady.....</i>	103 Barrett St.

<i>en</i>	Lloyd John Friday.....	<i>Schenectady</i> ...	25 Parkwood Blvd.
<i>en</i>	Charles Peter Gade.....	<i>Fullers</i>	123 Avenue B
<i>cl</i>	John Franklin Genung, Jr.....	<i>Amherst, Mass.</i>	Δ T House
<i>en</i>	Harold Henwood Gillespie.....	<i>New York City</i>	Ψ T House
<i>sc</i>	Ernest M. Gloeckner.....	<i>Watervliet</i>	35 Wendell Ave.
<i>en</i>	Homer Pershing Goff, Jr.....	<i>Crafton, Pa.</i>	A Δ Φ House
<i>ls</i>	Karl Hashagen Gorham.....	<i>Lenox, Mass.</i>	Φ Γ Δ House
<i>cl</i>	Arthur Dailey Greene.....	<i>Schenectady</i>	227 Union St.
<i>sc</i>	James Alfred Greene, Jr.....	<i>Albany</i>	Φ Δ Θ House
<i>en</i>	John Lane Greene.....	<i>Geneva</i>	420 Union St.
<i>pm</i>	Lawrence David Greene.....	<i>Bennington, Vt.</i>	636 Terrace Place
<i>en</i>	Carroll Calkins Grinnell.....	<i>Elmira</i>	16 No. Wendell Ave.
<i>en</i>	Edmund Judson Griswold.....	<i>Slingerlands</i>	X Ψ Lodge
<i>en</i>	Robert Newell Groner, Jr.....	<i>New York City</i>	Σ Φ Place
<i>en</i>	Clair Mansfield Guild.....	<i>Hancock</i>	Pyramid Club
<i>en</i>	Harold Van Dyke Gulick.....	<i>Brooklyn</i>	B Θ Π House
<i>pm</i>	Michel M. Hali.....	<i>Damascus, Syria</i> ...	404 Union St.
<i>en</i>	Edward Harvey Hall.....	<i>Luzerne</i>	21 University Place
<i>en</i>	John Russell Hartman.....	<i>Lebanon, Pa.</i>	Σ Φ Place
<i>sc</i>	Douglas Richard Hathaway...	<i>Schenectady</i> ...	10 No. Wendell Ave.
<i>en</i>	Howard Henry	<i>Argyle</i>	Pyramid Club
<i>en</i>	Ralph Allen Hunt.....	<i>Elmira</i>	Ψ T House
<i>en</i>	Alvaro Junqueira, Jr.....	<i>Curityba, Brazil</i>	N. S. S. C.
<i>sc</i>	Roland Van Ingen Kathan.....	<i>Schenectady</i>	413 Union St.
<i>en</i>	George John Kelley.....	<i>Plattsburgh</i>	609 State St.
<i>en</i>	Warren George Kelsey.....	<i>Portland, Me.</i>	B Θ Π House
<i>sc</i>	Robert William Keyes, Jr.....	<i>La Crosse, Wis.</i>	88 Circ'r St., S'ga
<i>en</i>	Leo Kliwen	<i>Schenectady</i>	1010 Stanley St.
<i>en</i>	Michael Marian Kolodziej.....	<i>No. Adams, Mass.</i>	23 Columbia St.
<i>en</i>	Alfred Sisson Ladd.....	<i>Holyoke, Mass.</i>	Δ T House
<i>en</i>	Allin Wilbur Ladd.....	<i>Holyoke, Mass.</i>	Δ T House
<i>cl</i>	Roland Eugene La Grange.....	<i>Schenectady</i> ...	149 Guilderland Ave.
<i>en</i>	Robert Nelson Landreth.....	<i>Schenectady</i>	College Hill
<i>pm</i>	Mayer Miller Lee.....	<i>Schenectady</i>	821 Lincoln Ave.
<i>en</i>	John Lewis Lehmann, Jr.....	<i>Elmira</i>	Φ Γ Δ House
<i>en</i>	David Beekman Little.....	<i>Rochester</i>	K A Lodge
<i>en</i>	Walker Bevins Lounsbery.....	<i>Randall</i>	103 Nott Terrace
<i>en</i>	Abner Marshall Lowman.....	<i>Elmira</i>	Ψ T House

<i>sc</i>	Varner Merrick Lyman.....	Lowville...133	Van Vranken Ave.
<i>cl</i>	Donald Willard MacCready....	Schenectady..31	University Place
<i>en</i>	Maurice James Mahaney.....	Fort Plain.....	Pyramid Club
<i>pm</i>	William Mitchall Mallia.....	Schenectady..417	Schenectady St.
<i>en</i>	Joseph Francis Manion.....	Ferndale.....	Δ Υ House
<i>sc</i>	William Bruce May, Jr.....	Irvington-on-Hudson.	A Δ Φ House
<i>sc</i>	John Warden McCauley, Jr....	Rochester.....	Ψ Υ House
<i>sc</i>	Donald Kennedy McCreary....	East Aurora.....	Σ Φ Place
<i>en</i>	Leon Schuler McGarty.....	Rome.....	Pyramid Club
<i>sc</i>	William James McGauley.....	Schenectady....	812 Hamilton St.
<i>pm</i>	John Grant McGill.....	Cohoes..71	Younglove Av., Cohoes
<i>en</i>	Allan McLean	Schenectady.....	R. F. D. No. 6
<i>pm</i>	Leo Thomas McMahan.....	Rome.....	N. S. N. C.
<i>en</i>	James Louis McMurray.....	Wildwood, N. J..	103 Nott Terrace
<i>pm</i>	James Duncan McNab.....	Troy.....	B Θ Π House
<i>cl</i>	Raymond Dewey Metzner.....	Glens Falls.....	604 Liberty St.
<i>sc</i>	Henry Mohler	Poughkeepsie....	725 Eastern Ave.
<i>pm</i>	Thomas Sylvester Mooney....	Cohoes.....	411 Mumford St.
<i>sc</i>	Charles Shelton Moora.....	Montclair, N. J.....	A Δ Φ House
<i>en</i>	Salvio de Camargo Moraes....	Sao Paulo, Brazil.....	S. S. S. C.
<i>pm</i>	William Reid Moser.....	Ellenville.....	O. G.
<i>pm</i>	Walter Charles Mott.....	Schenectady.....	1022 State St.
<i>en</i>	Ira Rogers Nelson.....	South Orange, N. J..	Δ Υ House
<i>sc</i>	Harry Hazleton Newton.....	Ballston.....	O. G.
<i>cl</i>	Thomas John Norton.....	Troy.....	O. G.
<i>sc</i>	Arthur Lane Notman.....	Buffalo.....	A Δ Φ House
<i>pm</i>	Myron Elijah Osterhout.....	Newburgh.....	Φ Γ Δ House
<i>sc</i>	Charles Folger Oudin.....	Schenectady.....	7 Union St.
<i>sc</i>	Theodore De Cou Palmer, Jr....	Syracuse.....	A Δ Φ House
<i>en</i>	George Blaine Parker.....	Amsterdam.	R. F. D. No. 5, A'dam
<i>en</i>	Lloyd Lester Parker.....	North Adams, Mass...	M. S. S. C.
<i>sc</i>	James Stewart Parsons.....	Gloversville.....	Δ Φ House
<i>sc</i>	Edward Stuart Patterson.....	Schenectady.....	A Δ Φ House
<i>sc</i>	Robert Hamilton Persons.....	East Aurora.....	A Δ Φ House
<i>sc</i>	Ralph Alonzo Peters.....	Schenectady..51	Washington Ave.
<i>cl</i>	Antwine James Pheneuf.....	Perry's Mills.....	No. Colonnade
<i>sc</i>	Harry Van Ness Philip, Jr....	Schenectady.....	Σ Φ Place
<i>sc</i>	John Howard Nott Potter.....	New York City.....	Σ Φ Place

<i>en</i>	Joseph Ransdell Powell.....	<i>Lake Providence, La...</i>	Δ Φ House
<i>en</i>	Marselis Powell	<i>Scotia.....R. F. D. No. 8, Scotia</i>	
<i>en</i>	Allen H. Jackson Preston.....	<i>Elmira.....</i>	K A Lodge
<i>en</i>	Robert Wayne Raynsford.....	<i>Albany.....</i>	Δ T House
<i>en</i>	Leonard Nelson Reed.....	<i>Lackawanna.....</i>	Φ Δ Θ House
<i>en</i>	Samuel Robinson	<i>Schenectady..</i>	319 Schenectady St.
<i>en</i>	Paul Joseph Roche.....	<i>Dansville.....</i>	223 Seward Place
<i>cl</i>	Henry Elchanon Rosenberg...	<i>Glens Falls.....</i>	357 Veeder Ave.
<i>en</i>	George Dan Rosenthal.....	<i>St. Louis, Mo.....</i>	O. G.
<i>sc</i>	Walter Andrew Rowley.....	<i>Albion.....</i>	X Ψ Lodge
<i>en</i>	Victor Herman Scales.....	<i>Glens Falls.....</i>	Δ Φ House
<i>en</i>	Sanford Oatman Schamberger...	<i>Gloversville.....</i>	No. Colonnade
<i>sc</i>	Oscar Joseph Schultz.....	<i>Albany.....</i>	7 Teunis St., Albany
<i>en</i>	William Ernest Shapiro.....	<i>Glens Falls.....</i>	606 Terrace Place
<i>sc</i>	Madison Lewis Sheely.....	<i>Albany..</i>	299 Clinton Ave., Albany
<i>cl</i>	Francis Adam Shields, Jr.....	<i>Albany.....</i>	A Δ Φ House
<i>en</i>	George Wayne Simmons.....	<i>Dolgeville..</i>	135 Van Vranken Ave.
<i>sc</i>	Henry Oscar Sittner.....	<i>Schenectady.....</i>	83 Mill St.
<i>en</i>	George Russell Smith.....	<i>Sybertsville, Pa.....</i>	N. S. N. C.
<i>pm</i>	Herbert Bryant Smith.....	<i>Gloversville.....</i>	Δ Φ House
<i>en</i>	Wilmot Merle Smith.....	<i>Elmira.....</i>	Φ Γ Δ House
<i>en</i>	De Witt Smith Snell.....	<i>St. Johnsville.....</i>	S. S. N. C.
<i>en</i>	Lewis Eugene Snell.....	<i>St. Johnsville....</i>	23 Waverly Place
<i>pm</i>	Willard Henry Spear.....	<i>Troy.....</i>	Φ Γ Δ House
<i>en</i>	Fred Griswold Stebbins.....	<i>Little Falls.....</i>	Δ T House
<i>pm</i>	Arthur Charles Swartz.....	<i>Albany.....</i>	No. Colonnade
<i>en</i>	Harold Ransom Tallmadge....	<i>Schenectady.....</i>	Route No. 49
<i>cl</i>	Brenton Thompson Taylor....	<i>Hartford.....</i>	Δ Φ House
<i>en</i>	Francis Marshall Terry.....	<i>Little Falls.....</i>	636 Terrace Place
<i>en</i>	Frederic de P. Townsend.....	<i>Negaunee, Mich.....</i>	Σ Φ Place
<i>en</i>	Herbert Warren True.....	<i>Fayville, Mass.....</i>	College Hill
<i>en</i>	John Lasher Turner.....	<i>Elmira.....</i>	16 No. Wendell Ave.
<i>en</i>	Arthur Milton Underwood....	<i>Schenectady.....</i>	202 Wright Ave.
<i>en</i>	Raymond George Urban.....	<i>Buffalo.....</i>	O. G.
<i>sc</i>	John Wheeler Van Loan.....	<i>Athens.....</i>	16 No. Wendell Ave.
<i>ls</i>	Charles Benjamin Van Patten..	<i>Carman</i>	Carman
<i>pm</i>	Reginald Van Woert.....	<i>Athens.....</i>	121 Mason St.
<i>en</i>	Frederick Aldhous Vernon....	<i>Schenectady.....</i>	838 Crane St.

<i>en</i>	Schuyler Ver Planck Vought...	<i>East Aurora</i>	Σ Φ Place
<i>pm</i>	Edward Joseph Walsh, Jr.....	<i>Troy</i>	395 First St., Troy
<i>en</i>	William Maxwell Watts.....	<i>Schenectady</i>	1381 Union St.
<i>sc</i>	Harry Weaver	<i>Amsterdam</i>	13 Jackson St., A'dam
<i>en</i>	Joseph Louis Weinert, Jr.....	<i>New York City</i>	Φ Δ Θ House
<i>en</i>	Gilbert Henry Wiley.....	<i>North Granville</i>	1120 State St.
<i>en</i>	Wesley Addison Williams.....	<i>Earlville</i>	21 University Place
<i>sc</i>	Benjamin John Willson.....	<i>Amsterdam</i>	30 Garden St., A'dam
<i>pm</i>	Arthur Raymond Wilsey.....	<i>Greenfield C't'r</i>	109 V. Vran'n Av.
<i>sc</i>	Hollis Witbeck	<i>Scotia</i>	27 Vley Road, Scotia
<i>en</i>	Edwin R. Wood.....	<i>Glenmont</i>	204 Avenue A
<i>sc</i>	Clarence Upson Young.....	<i>Los Angeles, Calif</i>	Ψ T House
<i>sc</i>	Isadore Yavits	<i>Schenectady</i>	918 Emmett St.
<i>en</i>	Norman George Zautner.....	<i>Albany</i>	34 Washington Av., Scotia
<i>en</i>	Jacob Zehfuss	<i>West Albany</i>	R. F. D. No. 1, W.A.
Freshmen—181.			

Summary of Students, Union College

Candidates for the Master's Degree.....	24
Graduate Students	16
Seniors	62
Juniors	103
Sophomores	108
Freshmen	181
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Total	494
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STUDENTS OF THE ALBANY MEDICAL COLLEGE

Fourth Year Class

James MacFeeters Archibold.....	Cohoes
Harold Arthur Bancroft.....	Schenectady
Morgan Otto Barrett.....	Albany
Jacob Blumberg.....	Jersey City, N. J.
Edward Oscar Boller.....	Elizabeth, N. J.
William Charles Brons.....	Jamaica
John Dennis Carroll.....	Troy
William James Carroll.....	Sag Harbor
Lawrence Henry Cotter.....	Poughkeepsie
Richard Patrick Doody.....	Cohoes
Loyal Lindsey Dunlop.....	Stony Creek
Henry Edward Elwood, Jr.....	Corning
James Walter Fitzgerald.....	Troy
Glenn Daniel Frost.....	Van Hornesville
Karl Gebhard.....	Mount Vernon
William Goldhush	Brooklyn
John Luverne Hemstead, Ph. G.....	Waterford
Hyman Hershberg	Albany
Frederic William Holcomb.....	Palenville
Howard Conkling Johnston.....	Horicon
John Christian Knapp.....	Philmont
Charles Augustus Krauss.....	Watervliet
Francis James Lawler.....	Pulaski
Frank Buckley Maguire.....	Albany
Royal Harrison Mayhew.....	Antwerp
Edward Leo McDermott, B. S.....	Schenectady
John Williams McKeever.....	Newburg
Walter McShane.....	Troy
Edward Bernard O'Keeffe.....	Albany
Matthew Francis Olstein.....	Peekskill
Robert Morris Palmer, A. B.....	Gloversville
Orla James Park.....	Hudson Falls
Harold Artemus Peck.....	Albany
Ray Eugene Persons.....	Jewett
Abraham Max Rabiner.....	Albany

George Mark Richard.....	Troy
Clarence Fay Rinkle.....	Boonville
Lester Edwin Sanford.....	Albany
Leslie Boyd Seaport.....	Cohoes
Howard Barton Swan.....	Chestertown
Harry Knibb Tebbutt, Jr.....	Albany
Leo Ross Tighe.....	Cohoes
Wesley Allter Van Deusen.....	St. Johnsville
Howard C. Van Keuren.....	North White Lake
Earl Charles Waterbury.....	Campbell Hall
Theodore Stephen West.....	New York
Raeburn James Wharton.....	Richmondville
Fourth Year Class — 47.	

Third Year Class

Stanley Earl Alderson.....	Little Falls
Milton Aronowitz, B. S.....	Albany
Clarence Walter Barth.....	Schaghticoke
Raymond Gernand Bell.....	Auburn
James Michael Bernhard.....	Amsterdam
Sidney William Bisgrove, B. S.....	Schenectady
Anathol Michael Breault.....	Cohoes
Leroy Joseph Butler.....	Waterford
Norman Scott Cooper.....	Athens
Leon Charles Coté.....	Lake George
Howard Wilcox Davis.....	Schenectady
Edward Thomas Delehanty.....	Albany
Louis Joseph DeRusso.....	Albany
Albert Stuart Ferguson.....	Schenectady
William Edwin Gazeley.....	Albany
Samuel William Green.....	Brooklyn
Daniel Francis Hannon.....	Pittsfield, Mass.
Harold Colvin Haviland.....	Hudson Falls
Kent Wood Jarvis.....	Delanson
Howard Marion Kenyon.....	Albany
Raymond Francis Kircher.....	Albany
Maximilian Kohlenberg, Jr.....	Brooklyn
Robert Atherton MacTaggart.....	Schenectady

John Francis McGovern, Jr.....	New Brunswick, N. J.
Charles Mester.....	New York
James Madison Neary.....	Watervliet
William Panitch	Brainard
George Trecise Polk, Jr.....	Poughkeepsie
John Joseph Randall.....	Albany
Jacob Resnik.....	New York
John Harry Robbins, Ph. G.....	Rensselaer
John Hourne Robertson.....	South Glens Falls
Ivan Michael Schneible.....	Albany
Norman Leo Sheehe.....	Dunkirk
George Milo Thomas.....	Adams Centre
Ralph Waldo Turner.....	Albany
Chester Bruce Van Gaasbeek.....	Kingston
Irving Van Woert.....	Albany
George Clark Vogt.....	Kingston
Frank William Aloy Wehle.....	Rochester
Aaron Weinberg.....	New York
Earle Wayne Wilkins.....	West Albany
Burchard Alfred Winne.....	Hancock
Third Year Class — 43.	

Second Year Class

Charles Pahl Archambeault.....	Brooklyn
David Samuel Babtkis.....	New York
Nathaniel Broadman.....	New York
Hubert Francis Carroll.....	Indian Lake
James Jasoloski Clement.....	Schenectady
Mark Joseph Daley.....	Dunkirk
Albert Henry Faber, Jr.....	Schenectady
Carl Charles Giannotti.....	New Haven, Conn.
Isaac Goldstein.....	New York
Albert Leonard Hayes.....	Hoosick Falls
Charles James Higley.....	North Adams, Mass.
Patrick Henry Huntington.....	Fort Edward
Milton James Jacobson.....	Troy
Gerald Reid Jameison.....	Albany

George Mark Richard.....	Troy
Clarence Fay Rinkle.....	Boonville
Lester Edwin Sanford.....	Albany
Leslie Boyd Seaport.....	Cohoes
Howard Barton Swan.....	Chestertown
Harry Knibb Tebbutt, Jr.....	Albany
Leo Ross Tighe.....	Cohoes
Wesley Allter Van Deusen.....	St. Johnsville
Howard C. Van Keuren.....	North White Lake
Earl Charles Waterbury.....	Campbell Hall
Theodore Stephen West.....	New York
Raeburn James Wharton.....	Richmondville
Fourth Year Class — 47.	

Third Year Class

Stanley Earl Alderson.....	Little Falls
Milton Aronowitz, B. S.....	Albany
Clarence Walter Barth.....	Schaghticoke
Raymond Gernand Bell.....	Auburn
James Michael Bernhard.....	Amsterdam
Sidney William Bisgrove, B. S.....	Schenectady
Anathol Michael Breault.....	Cohoes
Leroy Joseph Butler.....	Waterford
Norman Scott Cooper.....	Athens
Leon Charles Coté.....	Lake George
Howard Wilcox Davis.....	Schenectady
Edward Thomas Delehanty.....	Albany
Louis Joseph DeRusso.....	Albany
Albert Stuart Ferguson.....	Schenectady
William Edwin Gazeley.....	Albany
Samuel William Green.....	Brooklyn
Daniel Francis Hannon.....	Pittsfield, Mass.
Harold Colvin Haviland.....	Hudson Falls
Kent Wood Jarvis.....	Delanson
Howard Marion Kenyon.....	Albany
Raymond Francis Kircher.....	Albany
Maximilian Kohlenberg, Jr.....	Brooklyn
Robert Atherton MacTaggart.....	Schenectady

John Francis McGovern, Jr.....	New Brunswick, N. J.
Charles Mester.....	New York
James Madison Neary.....	Watervliet
William Panitch	Brainard
George Trecise Polk, Jr.....	Poughkeepsie
John Joseph Randall.....	Albany
Jacob Resnik.....	New York
John Harry Robbins, Ph. G.....	Rensselaer
John Hourne Robertson.....	South Glens Falls
Ivan Michael Schneible.....	Albany
Norman Leo Sheehe.....	Dunkirk
George Milo Thomas.....	Adams Centre
Ralph Waldo Turner.....	Albany
Chester Bruce Van Gaasbeek.....	Kingston
Irving Van Woert.....	Albany
George Clark Vogt.....	Kingston
Frank William Aloy Wehle.....	Rochester
Aaron Weinberg.....	New York
Earle Wayne Wilkins.....	West Albany
Burchard Alfred Winne.....	Hancock

Third Year Class — 43.

Second Year Class

Charles Pahl Archambeault.....	Brooklyn
David Samuel Babtakis.....	New York
Nathaniel Broadman.....	New York
Hubert Francis Carroll.....	Indian Lake
James Jasoloski Clement.....	Schenectady
Mark Joseph Daley.....	Dunkirk
Albert Henry Faber, Jr.....	Schenectady
Carl Charles Giannotti.....	New Haven, Conn.
Isaac Goldstein.....	New York
Albert Leonard Hayes.....	Hoosick Falls
Charles James Higley.....	North Adams, Mass.
Patrick Henry Huntington.....	Fort Edward
Milton James Jacobson.....	Troy
Gerald Reid Jameison.....	Albany

Frank Andrew Kane.....	West Webster
Victor Joseph Mallet.....	Troy
Anthony Pendola.....	Brooklyn
Barney Weeks Phillips.....	Hartwick
Gerald Herbert Porter.....	Wilmington, Vt.
Samuel Posner.....	Brooklyn
Edward Grady Sheehan.....	Watervliet
George Edward Smith.....	Troy
Charles Francis Walsh.....	Watervliet
Second Year Class — 23.	

First Year Class

Romeyn Treadwell Allen.....	Schenectady
Arthur Curtis Burnett.....	Hopewell Junction
James Francis Byrne.....	Troy
Joseph Michael Casey.....	Troy
Bernard Roger Coleman.....	Green Island
Lewis Smith Conrad.....	Union Church
Lawrence James Dailey.....	Gloversville
Gilbert Henry Daring.....	Voorheesville
Paul Armand Dussault.....	Cohoes
Jacob Epstein.....	Poughkeepsie
William Irving Goewey, Jr.....	Albany
Joseph O'Connor Kiernan.....	Troy
William Atwood Larkin, Ph. G.....	Albany
George N. Leonard.....	Albany
William Francis McDermott.....	Waterford
Alfred Lawrence Madden.....	Troy
Alexander Mason.....	Gloversville
Floyd Edward Miller.....	Warsaw
Webster Merchant Moriarta.....	Saratoga Springs
Thomas Francis Morrissey.....	Troy
John Joseph Phelan, Jr.....	Albany
Thomas William Phelan.....	Troy
Alexander William Pietraszewski.....	Schenectady
David Clark Shinaman.....	Troy
Edson Hun Steele.....	Mongaup Valley

Glenn Almy Thomas.....	Corning
John Francis Timpane.....	Troy
First Year Class — 27.	

Special Students

Samuel Cooliss.....	Brooklyn
Charles Willard Green.....	Schenectady
Frank Phillip Schneider.....	Utica
Special Students — 3.	

Summary of Students, Albany Medical College

Fourth Year Class.....	47
Third Year Class.....	43
Second Year Class.....	23
First Year Class.....	27
Special Students.....	3
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Total	143
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STUDENTS OF THE ALBANY LAW SCHOOL

Third Year Class

Burnes F. Barford.....	Valatie
William Bentley.....	Albany
Rudolph J. Blais.....	Cohoes
Fletcher A. Blanchard.....	Albany
Lilian Brockow.....	Albany
Charles Raymond Burton.....	Brookview
Henry A. Cohen.....	Albany
John J. Connors.....	Albany
Edward T. Coyle.....	Glens Falls
Henry V. Delaney.....	Albany
Earl Leslie Dey.....	Freeville
John D. Dickson.....	Angelica
Francesco De Lellis.....	Campobasso, Italy
Irma D. Ellis.....	Albany
Roscoe V. Elsworth.....	Port Ewen
Palmer W. Everts.....	Granville
Rocco M. Fischette.....	Clyde
Byron S. Fox.....	Rome
Horatio G. Glen, Jr.....	Schenectady
J. Howard Hahn.....	Albany
Frederick Stanley Harris.....	Peekskill
L. Victor Harrison.....	Johnstown
James Hayden	Troy
Henry R. Herman.....	Newburgh
John G. Hines.....	Albany
George B. Hurley.....	Warrensburgh
Cornelius R. Johnson.....	Lansingburgh
Luel F. Johnson.....	Rochester
Ambrose J. Kelly.....	Mechanicsville
James E. Kelly.....	Troy
John W. Kennedy.....	Troy
Harlan Kenyon	Troy
Edgar S. Knox.....	Albany
Paul Knox	Troy
John W. McConnell.....	Valatie

Archibald R. MacKenna	Poughkeepsie
Henry Bacon Merritt	Goshen
William N. Nicoll	Scotia
James B. O'Brien	Glens Falls
James A. O'Connor	Waterford
Timothy O'Connor	Boston, Mass.
George Melvin Osgoodby	Baltimore, Md.
Raymond C. Prime	Upper Jay
William F. Pritchard	Albany
José Ramon Quinones	Mayaguez, Porto Rico
Edward F. Ryan	Monticello
William Risley	Kingston
Henry J. Semo	Rome
Charles A. Sibbald	Troy
Ralph L. Smith	Monticello
Sherwood B. Speed	Hudson
Forrest E. Stack	North Creek
Alfred H. Stamper	Albany
Howard E. Taylor	Binghamton
Aurelius M. Tracey	Hudson
Frederic R. Twelvetrees	Cohoes
Edward F. N. Uthe	Coeymans
Hendrick W. Van Ness	Greenwich
J. Emmett Wall	Albany
Arthur C. Ward	Schenectady
Harold Gibson Wentworth	Albany
Frank L. Wiswall	Watervliet
Cornelius J. Wood	Chatham
Third Year Class — 63.	

Second Year Class

Charles P. Andrews	Saratoga Spa
C. Watson Arthur	Troy
John K. Austin	Schenectady
Albert H. Bacon	Rensselaer
James A. Ball	Watervliet
Chatfield T. Bates	Schenectady

Arthur A. Beaudry.....	Cohoes
David Belkin	Albany
Clarence K. Butler.....	Saratoga Spa
Edgar D. Cantwell.....	Albany
Irving J. Chamberlain.....	Cohoes
F. Raymond Chant.....	Johnstown
Edward Jun Chü.....	Canton, China
Earle G. Clarke.....	Mechanicsville
Charles C. Coleman.....	Goshen
George Henry Cronin.....	Albany
Hugh J. Crumm.....	Selkirk
William F. Darby.....	Troy
William Deckelman	Obernburg
John J. Delaney.....	Troy
Frank E. Devans.....	Rochester
Anna Grace Dolan.....	Albany
Decelia A. Doran.....	Troy
Edgar J. Downs.....	Peru
Marion E. Dunham.....	Saratoga
C. B. Dunham.....	Westkill
Rodney Ray Ellis.....	Poultney, Vt.
Kenneth H. Fake.....	Cobleskill
A. L. Flanders.....	St. Johnsville
Maurice Walter Flynn.....	Westerly, R. I.
E. Ralph Gosier.....	Rosiere
Frederick G. Hazard.....	Utica
E. Francis Holland.....	Schenectady
Thomas Palmer Huxtable.....	Troy
Maurice M. Katz.....	Schenectady
Justin B. Kelly.....	Saratoga Spa
John J. Kelly.....	Troy
John A. Kosinski.....	Amsterdam
Wankoi Lam.....	Canton, China
W. Mace Laraway.....	Oak Hill
Floyd A. Lane.....	Menands
Louis Lieberman	Rensselaer
Michael D. Lombardo.....	Jamestown
Ernest P. Lyons.....	Plattsburgh

James A. McCarthy.....	Troy
John S. McGrath.....	Watervliet
Joseph B. McEntee.....	Albany
James J. Macksey.....	Norwich
Carleton Marvin.....	Hoosick Falls
Nathan Medwin.....	Albany
Joseph M. Mesnig.....	Troy
Amos Delany Moscrip.....	Albany
James M. Noonan.....	Mechanicsville
Edward C. O'Connell.....	Barrytown
Charles O'Donnell.....	Poughkeepsie
William H. O'Neil.....	Albany
Hugh Francis O'Neil.....	Schenectady
Thomas Francis O'Neil.....	Albany
Albert J. Ornsteen, Jr.....	Poughkeepsie
Katharine A. Paddock.....	Malone
Andrew A. Padula.....	Albany
Helen Burritt Page.....	Albany
William S. Quinterro.....	Poughkeepsie
Herbert J. Hambert.....	Webster
Kenneth W. Rice.....	Albany
E. Howard Ringrose.....	Rome
Edward L. Ryan.....	Troy
Benjamin Saperstein.....	Troy
Monroe Scheslinger.....	Kingston
John M. Schneider.....	Albany
Eugene J. Sheeran.....	Albany
Meyer H. Slack.....	Haverstraw
Lawrence Stage.....	Warwick
G. Gordon Steele.....	Albion
Clifford C. Tennies.....	E. Randolph
Hugh K. Tobias.....	Albany
Maynard K. Van Deusen.....	Cobleskill
William Wallace Visscher.....	Holland, Mich.
Harold W. Ward.....	Gloversville
Walter J. Ward.....	Albany
John William Welch.....	Coxsackie

Robert H. Wright.....	Rensselaer
Coplon Yaras	Albany
Second Year Class — 83.	

First Year Class

Leland W. Adams.....	Watertown
Mariano Acosta.....	Mayaguez, Porto Rico
John E. Bossidy.....	W. Stockbridge, Mass.
Willard L. Best.....	Cape Vincent
Harold R. Beyerl.....	Schenectady
Earle N. Bishopp.....	Munnsville
Chester A. Blauvelt.....	Albany
Lael William Breen.....	Lowville
Raymond J. Brown.....	Syracuse
Donald L. Brush.....	Herkimer
Raymond E. Burdick.....	Gloversville
Gardner King Byers.....	Suffern
Paul D. Carrigg.....	Owego
John Victor Clarke.....	Watertown
Morris Cohen	Newburgh
Edward F. Collisson.....	Troy
Andrew J. Culick.....	Amsterdam
James S. Drake, Jr.....	Bath
Clement Fernandez, Jr.....	Carolina, Porto Rico
Norman F. Frame.....	New York City
Anthony Gischette	Clyde
John F. Gallagher.....	Westerly, R. I.
Ashley C. Glover.....	Schenectady
Emmett A. Glynn.....	Johnstown
Raymond P. Grabo.....	Battle Creek, Mich.
Joseph H. Harris.....	Kattskill Bay
José A. Hernandez.....	Ciales, Porto Rico
James H. Hoffnagle.....	Ticonderoga
Leona M. Johnson.....	Granville
Morris J. Kaman.....	Rochester
Vincent Kiebala	Buffalo
William J. Killea.....	Albany

Chandler S. Knight.....	Schenectady
John Knox	Albany
Henry Landau	Albany
Joseph A. Landry.....	Rouses Point
Edward J. Layden.....	Troy
W. Elmer Lyons.....	Schenectady
William F. Leary.....	Richfield Springs
John D. Lynn.....	Rochester
Thomas W. McDonald.....	Port Henry
John C. McEntee.....	Albany
William J. Mahar.....	Troy
George A. Marcus.....	Schenectady
Edgar Nash Miller.....	Albany
W. Earl Mengerink.....	Rochester
Eugene A. Molitor.....	Albany
Daniel J. Murphy.....	Troy
Arman D. McQuillan.....	Plattsburgh
Robert F. T. O'Connor.....	Albany
Harold J. O'Keeffe.....	Luzerne
Frederick H. Purdy.....	Schenectady
Frank T. Quinn.....	Norwich
Paul E. Quirin.....	Albany
John R. Riley.....	Plattsburgh
George B. Roberts.....	Winter Park, Florida
Edward G. Rogan.....	Albany
Allen Rosenberg	Rochester
Franklin A. Schriver.....	Chester
James E. Scully.....	Rensselaer
Joseph Shanley	Troy
Elmer Shear, Jr.....	Ravena
E. E. Sherman.....	New Baltimore
Richard J. Sherman.....	Saratoga
Thomas Sylvester	Albany
George M. Skinner.....	Albany
Louis Snyder	Albany
John B. Sterley.....	Ravena
Alexander A. Stewart.....	Burnt Hills
Arlen T. St. Louis.....	Schenectady

Francis A. Sturges.....	Waterport
Walter F. Swanker.....	Schenectady
James A. Thompson.....	Schenectady
Benjamin R. Tunick.....	Port Chester
Richard Tunick.....	Port Chester
Samuel J. Van Kleeck.....	Kerhonkson
Edgar K. Walrath.....	Scotia
James B. Warnock.....	Troy
W. Augustus Williams.....	Warsaw
Lafayette A. Wiltsie.....	Steamburg
Hingting Wong.....	Hongkong, China
First Year Class — 81.	

Special Students

Grant M. Brinnier.....	Kingston
Leo A. Cain.....	Sterlingville
Joseph Reeback	Newburgh
Peter A. Roger.....	Watervliet
Special Students — 4.	

Summary of Students, Albany Law School

Third Year Class.....	63
Second Year Class.....	83
First Year Class.....	81
Special Class	4
<hr/>	
Total	231
<hr/>	

STUDENTS OF THE ALBANY COLLEGE OF PHARMACY

Second Year Class

Dewi B. Armstrong.....	Warwick
Edgar H. Barrett.....	Windsor
George Bonner	Luzerne
James H. Bonner, Jr.....	Luzerne
William P. Briggs.....	Norwich
Horace M. Carter.....	Salisbury, Vt.
Clifford P. Collins.....	Troy
Francis DeS. Conroy.....	Norwich
Thomas V. Conway.....	Canajoharie
James H. Cunningham.....	Warrensburgh
Alexander Deiches	Albany
Joseph E. De Lafayette.....	Ballston Spa
Arthur V. Ellsworth.....	Glens Falls
Joseph Epstein	Albany
Lester R. Finklestein.....	Albany
William A. Geary.....	Troy
Loretta E. Graney.....	Hoosick Falls
Sarah E. Graney.....	Hoosick Falls
Margaret R. Griffin.....	Albany
Ben A. Hensler.....	Albany
Herschel J. Hess.....	Albany
Meryll C. Hoagland.....	Cobleskill
Charles R. Hutchins, Jr.....	Norwich
Teressa C. Ingraham.....	Troy
Chester K. Jones.....	Canajoharie
Patrick E. Kiley.....	Schuylerville
John W. King.....	Rensselaer
Edward F. Leahy.....	Ballston Spa
Ralph M. Lord.....	Tannersville
George D. Luff.....	St. Johnsville
Ruby M. Lupton.....	Roscoe
Ralph C. Moody.....	St. Regis Falls
Raymond W. Munger.....	Dolgeville
Paul S. Murphy.....	Auburn
Harold D. Newton.....	Gloversville

Elizabeth J. Noonan.....	Schenevus
John H. Palmer.....	Marlboro
Ralph T. Pollock.....	Argyle
Raymond C. Quinlan.....	Bennington, Vt.
Harold J. Schafer.....	Fulton
Marvin D. Scott.....	Walton
Arthur E. Seitzinger.....	Hudson Falls
Harold M. Seitzinger.....	Hudson Falls
George J. Smith.....	Ellenville
John V. Smith.....	Chatham
Fred L. Stilson.....	Cobleskill
Raymond H. Stoetzel.....	Schenectady
Kenneth W. Swain.....	North Creek
Ruth S. Tafft.....	Watervliet
J. Rossman Tiffany.....	Hudson
Raymond C. Van Vliet.....	Hudson
Norman E. Waters.....	Rensselaer
Lester E. Whitford.....	Fort Edward
Second Year Class — 53.	

First Year Class

Louis J. Aker.....	Albany
Willard K. Barton.....	Fort Edward
Cecil E. Brooker.....	Schenectady
Charles V. Byrne.....	Poughkeepsie
Joseph Candido.....	Albany
Frederick L. Carr.....	Rensselaer
Grant C. Carter.....	Canaan, Conn.
Joseph T. Cavanaugh.....	Troy
John B. Cloke.....	Hoosick
Henry P. Conron.....	Norwich
Leo F. Corrigan.....	Dannemora
Ralph T. Curtis.....	Troy
Joseph M. Doherty.....	Albany
Charles A. Edwards.....	Albany
Floyd K. Ellsworth.....	Glens Falls
Walter J. File.....	Mechanicsville

Buell H. Francisco.....	Chatham
Harry Frumkin.....	Schenectady
Robert M. Galloway.....	Whitney Point
Harold Glazier.....	Gouverneur
Gabriel E. Greeley.....	Cohoes
Don M. Hardenbrook.....	Phelps
Marvin D. Harmon.....	Chatham
Edwin Heisinger.....	Palenville
Stewart H. Himes.....	Troy
George N. Hoffman.....	Chatham
Louis Krouner.....	Nassau
Ralph P. Lansing.....	Mechanicville
Robert R. Lavine.....	Troy
John L. Lindsay.....	Olmsteadville
Livingston F. Lossa.....	Canajoharie
Thomas J. Mack.....	Troy
Howard G. Maclaury.....	New Paltz
J. Carl Mangelsdorf.....	Saratoga Springs
Francis J. McGowan.....	Albany
David J. Meyerhoff.....	Schenectady
Hyman Moses.....	Newburgh
Thomas P. Mullen.....	North Lawrence
Ethel Naumoff.....	Schenectady
Ralph D. Robertson.....	Amsterdam
Albert L. Sanford.....	Fulton
Charles W. Smith.....	Troy
Ralph H. Stafford.....	Essex
Frank A. Stevens.....	Essex
Donald R. Urquhart.....	Schenectady
Clifford N. Vogel.....	Canajoharie
Robert H. Ward.....	Schenectady
Harold Wensley.....	Syracuse
John M. Wild.....	Troy
John C. Wilson.....	Kinderhook
George C. Wortley.....	Cambridge
Franklin N. Wright, Jr.....	Northville
Ralph Young.....	Cobleskill

Summary of Students, Albany College of Pharmacy

Second Year Class.....	53
First Year Class.....	53
	<hr/>
Total	106
	<hr/> <hr/>

SUMMARY OF STUDENTS, UNION UNIVERSITY

Union College	494
Albany Medical College.....	143
Albany Law School.....	231
Albany College of Pharmacy.....	106
	<hr/>
Total	974
	<hr/> <hr/>

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OF
UNION UNIVERSITY



1916-1917

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FRANK H EVORY & Co
ALBANY N Y

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UNION UNIVERSITY

Union University embraces the following institutions:
UNION COLLEGE, Founded 1795

Academic Department	{	Classical Course
		Latin Scientific Course
		Scientific Course
		Pre-medical Course

Engineering Department	{	General Engineering Course
(Established 1845)		Electrical Engineering Course

ALBANY MEDICAL COLLEGE, Founded 1838

ALBANY LAW SCHOOL, Founded 1851

DUDLEY OBSERVATORY, Founded 1852

ALBANY COLLEGE OF PHARMACY, Founded 1881

Union College acquired by its charter, granted in 1795, full university powers, but the creation of graduate institutions at Schenectady was not then found practicable. Schools of law and medicine and also an astronomical observatory have long existed at Albany, only a few miles distant. The arrangement naturally suggested by these circumstances was, that the professional schools and the observatory at Albany should be united with Union College, under the charter and board of trustees of the latter. This was accordingly effected by the incorporation of Union University in 1873. The Albany College of Pharmacy was created by the board of governors on June 21, 1881, and incorporated as a department of the university on August 21 of the same year.

The president of Union College and permanent chancellor of Union University has the oversight of the university, each of the institutions having its resident dean. The dean of Union College acts in the place of the president in the latter's absence and also has charge of matters delegated to him by the president. The university board of governors is composed of permanent trustees of Union College and of representatives of each of the other institutions embraced in Union University.

1916—UNIVERSITY CALENDAR—1917

1916

First semester of Union College begins..Monday, September 18
 First semester of Law School begins....Tuesday, September 19
 First semester Medical College begins....Monday, September 25
 First semester College of Pharmacy.....Monday, September 25
 Election day — recess.....Tuesday, November 7
 Thanksgiving day — recess.....Thursday, November 30
 Christmas recess in all departments.....Saturday, December 23

1917

Sessions resumed.....Wednesday, January 3
 Day of prayer for colleges.....Thursday, January 18
 First semester of Law School ends.....Monday, January 29
 Second semester of Law School begins.....Tuesday, January 30
 First semester Medical College ends.....Wednesday, January 31
 Second semester Medical College begins..Thursday, February 1
 First semester Union College ends.....Saturday, February 10
 Second semester Union College begins.....Monday, February 12
 Washington's birthday — recess.....Thursday, February 22
 Easter recess.....Friday-Monday, April 6-9
 Commencement, College of Pharmacy.....Tuesday, May 1
 Commencement, Law School.....Thursday, June 7
 Commencement, Medical College.....Friday, June 8
 Memorial day — recess.....Wednesday, May 30
 Commencement week, Union College,

Sunday-Wednesday, June 10-13

Entrance examinations, Union College,

Thursday-Friday, June 14-15

First semester Union College begins.....Monday, September 17
 First semester of Law School begins.....Tuesday, September 18
 First semester Medical College begins....Monday, September 24
 First semester College of Pharmacy.....Monday, September 24
 Election day — recess.....Tuesday, November 6
 Thanksgiving day — recess.....Thursday, November 29
 Christmas recess in all departments.....Saturday, December 22

For calendars of departments, see Pages 21, 163, 178, 183.

OFFICERS OF THE UNIVERSITY

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CHARLES ALEXANDER RICHMOND, D. D., LL. D.

Honorary Chancellor, 1916

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Vice-President, AMASA J. PARKER, LL. D.

Secretary, J. NEWTON FIERO, LL. D., Albany

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FRANKLIN H. GIDDINGS, LL. D.....	New York City
COURTLAND V. ANABLE.....	New York City

Albany Medical College

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ALDEN CHESTER.....	Albany

Albany Law School

AMASA J. PARKER, LL. D.....	Albany
J. NEWTON FIERO, LL. D.....	Albany

Dudley Observatory

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BENJAMIN WALWORTH ARNOLD.....	Albany

Albany College of Pharmacy

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CHARLES GIBSON.....	Albany

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Lecturer on the Federal Judicial System

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Instructor in Medicine

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WILLIAM KIRK, M. D.
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Instructor in Public Health

EDGAR R. STILLMAN, M. D.
Instructor in Medicine

CHARLES K. WINNE, JR., M. D.
Instructor in Medicine

EDWIN L. DRAPER, M. D.
Instructor in Surgery

PETER L. HARVIE, M. D.
Instructor in Surgery

ARTHUR H. STEIN, M. D.
Instructor in Surgery

ROLAND G. HOLT, M. D.
Instructor in Obstetrics

RICHARD B. GRAY, M. D.
Assistant in Microscopical Laboratory

KARL MELAMET, A. M.
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Instructor in French

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Instructor in History

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Instructor in Electrical Engineering

CHARLES VAN ORDEN TERWILLIGER
Instructor in Mathematics

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Instructor in Mathematics

THOMAS KING WHIPPLE, PH. D.
Instructor in English

SCHUYLER McC. MARTIN, M. D.
Instructor in Medicine

GEORGE E. BEILBY, M. D.
Instructor in Surgery

JOSEPH A. COX, M. D.
Instructor in Surgery

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Instructor in Surgery

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LAWRENCE I. EARLY, M. D.
Instructor in Pathology

LEROY JENKINS, A. B.
Assistant in Dudley Observatory

SEBASTIAN ALBRECHT, B. S., PH. D.
Assistant in Dudley Observatory

SHERWOOD B. GRANT, C. E.
Assistant in Dudley Observatory

ALBRECHT VON FLOTOW
Assistant in Dudley Observatory

UNION COLLEGE

Union College was incorporated by the Regents of the University of the State of New York on the 25th day of February, 1795. It was the second college incorporated in the state, and the first north of the city of New York and west of the Hudson river. It received its name from the circumstance that several religious denominations co-operated in its organization, and it was the first college in the United States which was not of a strictly denominational character. It has continued from its foundation to be a representative institution of Christian unity.

The first president of Union College was the Rev. John Blair Smith, of Philadelphia. He was elected in 1795, and resigned in 1799, only a few months before his death. He was succeeded by Jonathan Edwards, the younger, who died in 1801. The Rev. Jonathan Maxcy, previously president of Brown University, succeeded Dr. Edwards, resigning at the end of two years. In 1804 the Rev. Eliphalet Nott was elected president of Union College, which office he held until his death, on the 29th day of January, 1866. The Rev. Laurens P. Hickok, a graduate of the college, who had long acted as vice-president, was elected his successor. He resigned in 1868. The Rev. Charles A. Aiken succeeded Dr. Hickok in 1869, and resigned in 1871. The Rev. Eliphalet Nott Potter was elected president in 1871, and was inaugurated June 20, 1872. On his resignation, in 1884, the Hon. Judson S. Landon was appointed president *ad interim*, and served until the inauguration of Harrison E. Webster, who was elected president May 23, 1888, and inaugurated June 26, 1888. On his resignation, in January, 1894, Rev. Andrew V. V. Raymond was elected president, and was inaugurated in June, 1894. Dr. Raymond resigned July 18, 1907, and the Rev. George Alexander was appointed president *ad interim*. On January 28, 1909, Rev. Charles Alexander Richmond was elected president. Dr. Richmond was inaugurated June 7, 1909.

1916																
	S	M	T	W	T	F	S		S	M	T	W	T	F	S	
Sept.	..	..	..	..	..	1	2	Nov.	..	..	..	1	2	3	4
	3	4	5	6	7	8	9		5	6	7	8	9	10	11	
	10	11	12	13	14	15	16		12	13	14	15	16	17	18	
	17	18	19	20	21	22	23		19	20	21	22	23	24	25	
	24	25	26	27	28	29	30		26	27	28	29	30	..	..
Oct.	..	..	..	..	..	..	..	Dec.	..	..	..	..	..	1	2
	1	2	3	4	5	6	7		3	4	5	6	7	8	9	
	8	9	10	11	12	13	14		10	11	12	13	14	15	16	
	15	16	17	18	19	20	21		17	18	19	20	21	22	23	
	22	23	24	25	26	27	28		24	25	26	27	28	29	30	
29	30	31	..	..	..	..	..	31	..	..	..	..	..	..
1917																
	S	M	T	W	T	F	S		S	M	T	W	T	F	S	
Jan.	..	..	..	..	..	..	..	July	..	..	..	..	..	..	..
	7	8	9	10	11	12	13		1	2	3	4	5	6	7	
	14	15	16	17	18	19	20		15	16	17	18	19	20	21	
	21	22	23	24	25	26	27		22	23	24	25	26	27	28	
	28	29	30	31		29	30	31
Feb.	..	..	..	..	..	1	2	Aug.	..	..	..	1	2	3	4
	4	5	6	7	8	9	10		5	6	7	8	9	10	11	
	11	12	13	14	15	16	17		12	13	14	15	16	17	18	
	18	19	20	21	22	23	24		19	20	21	22	23	24	25	
	25	26	27	28	..	..	..		26	27	28	29	30	31	..
Mar.	..	..	..	..	1	2	3	Sept.	..	..	..	..	..	..	1
	4	5	6	7	8	9	10		2	3	4	5	6	7	8	
	11	12	13	14	15	16	17		9	10	11	12	13	14	15	
	18	19	20	21	22	23	24		16	17	18	19	20	21	22	
	25	26	27	28	29	30	31		23	24	25	26	27	28	29	
Apr.	..	..	..	..	..	..	..	Oct.	..	..	..	..	..	..	..
	1	2	3	4	5	6	7		..	1	2	3	4	5	6	
	8	9	10	11	12	13	14		7	8	9	10	11	12	13	
	15	16	17	18	19	20	21		14	15	16	17	18	19	20	
	22	23	24	25	26	27	28		21	22	23	24	25	26	27	
May	..	..	..	..	..	..	..	Nov.	..	..	..	..	..	..	..

	6	7	8	9	10	11	12		..	4	5	6	7	8	9	10
	13	14	15	16	17	18	19		11	12	13	14	15	16	17	18
	20	21	22	23	24	25	26		18	19	20	21	22	23	24	25
June	27	28	29	30	31	..	..	Dec.	25	26	27	28	29	30	31

	3	4	5	6	7	8	9		2	3	4	5	6	7	8	9
	10	11	12	13	14	15	16		9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	16	17	18	19	20	21	22	23	
24	25	26	27	28	29	30	31	23	24	25	26	27	28	29	30	

Figures in heavy type indicate days on which Union College is in session

UNION COLLEGE CALENDAR

1916

Conditions examinations.....Saturday, September 16
 Registration day for Freshmen.....Monday, September 18
 Entrance examinations....Tuesday-Wednesday, September 19-20
 Registration.....Tuesday-Wednesday, September 19-20
 First chapel exercises and recitations...Thursday, September 21
 Election day — recess.....Tuesday, November 7
 Thanksgiving day — recess, three days...Thursday, November 30
 Conditions examinations.....Friday-Saturday, December 8-9
 Allison-Foote prize debate.....Friday, December 15
 Christmas recess.....Thursday, December 23

1917

Recitations resumed.....Wednesday, January 3
 Day of prayer for colleges.....Thursday, January 18
 Examinations, first semester.....Wednesday, January 31
 First semester ends.....Saturday, February 10
 Registration, second semester.....Monday, February 12
 Recitations begin.....Tuesday, February 13
 Washington's birthday — recess.....Thursday, February 22
 Conditions examinations.....Friday-Saturday, April 13-14
 Easter recess.....Friday-Monday, April 6-9
 Selection of junior and sophomore orators....Saturday, April 16
 Presentation of prize essays.....Tuesday, May 1
 Senior examinations begin.....Monday, May 21
 Senior examinations end.....Saturday, May 26
 Memorial Day — recess.....Wednesday, May 30
 Examinations begin, second semester.....Thursday, May 31
 Examinations end, second semester.....Saturday, June 9
 Baccalaureate sermon.....Sunday, June 10
 Prize oratory of juniors and sophomores.....Monday, June 11
 Meeting of trustees, societies, alumni.....Tuesday, June 12
 President's reception.....Tuesday, June 12
 Commencement, second Wednesday in June..Wednesday, June 13
 Entrance examinations.....Thursday-Friday, June 14-15
 Conditions examinations.....Saturday, September 15
Fall Term, 1917-18, begins.....Monday, September 17

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CHARLES B. McMURRAY, A. M., Cannon Place, Troy

THOMAS B. LOCKWOOD, A. B., 212 Fidelity Bldg., Buffalo

FREDERICK W. CAMERON, A. M., Albany, term of office
 expiring June, 1917

WILLIAM PLATT ADAMS, A. B., Red Hook, term of office
 expiring June, 1918

HIRAM C. TODD, PH. B., Saratoga, term of office expiring
 June, 1919

FRANK BURTON, A. B., Gloversville, term of office expiring
 June, 1920

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GRANT HUNTLEY, C. E.
Instructor in Mathematics

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Instructor in French

PERRIN COMSTOCK GALPIN, A. M.
Instructor in History

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Instructor in Electrical Engineering

CHARLES VAN ORDEN TERWILLIGER, B. E.
Instructor in Mathematics

ALBERT HARRY CARLE, A. B.
Instructor in Chemistry

THOMAS KING WHIPPLE, A. B.
Instructor in English

PETER J. M. CLUTE, B. E.
Assistant in Physics Laboratory

Special Lecturers

WILLIS R. WHITNEY, PH. D.
Lecturer on Electro-Chemistry

IRVING LANGMUIR, PH. D.
Lecturer on Electro-Physics

Ichabod Spencer Lecturer on Psychology

JAMES ROWLAND ANGELL, A. M.
Head of the Department of Psychology, and Dean of the
Faculties of Arts, Literature and Science, in the
University of Chicago

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STAGE APPOINTMENTS — Professors McKean, Ellery, March, McDaniel, Chase

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STUDENT ACTIVITIES — Professors Opdyke, Ripton, Garis

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ABSENCES — Professors King, March, Stewart

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JUNIOR CLASS — Professors King, Hill, Taylor

SOPHOMORE CLASS — Mr. Salathe, Mr. Huntley, Mr. Carle

FRESHMAN CLASS — Professors Garis, McComber, Mr. Melamet

STANDING AND PROMOTION OF STUDENTS — The Dean, the Secretary, the Chairmen of the Class Committees

COLLEGE OFFICERS

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President

President's Rooms, South Colonnade

Consultation hour 12-1 daily

BENJAMIN H. RIPTON, PH. D., LL. D.

Dean

College Office

Office Hours 2:30-4 P. M.*

FRANK BAILEY, ART. D.

Treasurer

175 Remsen St., Brooklyn

HARTLEY F. DEWEY

Assistant Treasurer

College Office

Office Hours 8 A. M.-5 P. M.*

FRANK COE BARNES, PH. D.

Secretary

Room 1, Washburn Hall

Office Hours 3-5 P. M.*

JAMES H. STOLLER, PH. D.

Curator of the Museum

CHARLES N. WALDRON, B. S.

Secretary of the Graduate Council

Room 5, Washburn Hall

DEWITT CLINTON

Librarian

Library Hours 8 A. M.-1 P. M., 2-6 P. M.*, 7:30-9 P. M.

ESTHER G. ELY, Recorder, and Secretary to the Dean

JANE TUPER, Clerk to the Secretary

ANNE O'N. BEATTIE, Secretary to the President

*Except Saturday P. M.

COURSES OF STUDY

1. Courses leading to the Degree of A. B.

In the last two years of courses 1-3 below all studies are elective.

Classical Course A. Greek is required for admission to this course. Latin and Greek are continued for two years.

Classical Course B. This course may be pursued by candidates who satisfy the requirements for admission to the Ph. B. course. Greek is begun on entrance and required for two years.

2. Course leading to the Degree of Ph. B.

Latin-Scientific Course. This course offers Latin without Greek, for which is substituted additional work in modern languages and science.

3. Course leading to the Degree of B. S.

Scientific Course. This course is based upon the study of mathematics and the sciences, with extended work in English and other modern languages.

Students in full standing at the end of junior year who have the profession of medicine in view are permitted to take the first year studies of the Albany Medical College as a substitute for the studies of the senior year in Union College. The academic degree is conferred on the successful completion of the first year in the Medical College.

4. Course leading to the Degree of B. S. in Chemistry

This course prepares for positions in industrial chemistry, for teaching chemistry, or for university studies in candidacy for a doctor's degree in chemistry.

5. Courses leading to the Degree of B. E.

General Engineering Course. This course offers the foundation of a broad engineering education, comprising all the essential subjects of the profession. During the third and fourth years three alternative options are offered.

Option A. In this division the fundamental principles of advanced technical subjects receive emphasis.

Option B. In this division studies are offered which lead to a training for engineering positions of an executive or administrative nature.

Option C. In this division special work in sanitary engineering is given.

Electrical Engineering Course. This course is intended to give a broad and thorough engineering education, with the specific instruction requisite for electrical engineering. During the first two years of the course the work is the same as in the general engineering department; during the junior and senior years the two courses are wholly distinct.

6. One Year Pre-Medical Course

This course is offered to meet the requirements for admission to the Medical Department of Union University in accordance with the recommendations of the American Medical Association.

7. Courses leading to Graduate Degrees

Course leading to degree of M. C. E. This course of one year's graduate study, consists of lectures, laboratory practice and research work, and is open to graduates of the general or the sanitary engineering course of Union College, or of any other institution of a standing recognized by the faculty.

Course leading to degree of M. S. in E. E. This course of one year's graduate study, consists of lectures, laboratory practice and research work, and is open to graduates of the electrical engineering course of Union College, or of any other institution of a standing recognized by the faculty.

Course leading to degree of Ph. D. This course of two years' graduate study requires for admission the degree of M. S. in E. E. or an equivalent. For details of the work see page 124.

REQUIREMENTS FOR ADMISSION

Application and Registration

Blank forms of application to be filled out and forwarded in advance will be furnished by the secretary on request.

Candidates must be at least sixteen years old, and as a preliminary to registration, whether for examination or for enrollment, must present themselves at the office of the secretary on the date named in the calendar published in the college catalogue for the current year, and submit satisfactory testimonials of character.

Methods of satisfying the Requirements

By Examination. The regular entrance examinations are held on the Thursday and Friday immediately following Commencement, and on the Tuesday and Wednesday of the first week of the fall term. The schedule of examinations is given on pages 43-44. Candidates for examination in any subject are expected to present a recommendation from their school principal.

By C. E. E. B. Certificate. Candidates may take the uniform entrance examinations offered by the College Entrance Examination Board. The examinations of the board are held in June of each year, and a list of the places at which they are to be held is published by the board about March 1st. Applications to attend the board's examinations must be addressed to *College Entrance Examination Board, 431 West 117th Street, New York, N. Y.*, and must be made upon a blank form to be obtained from the secretary of the board upon application. The certificates of this board will be accepted for all subjects passed at a satisfactory grade.

By Regents Diploma. The academic and college entrance diplomas issued by the New York State Education Department will be accepted so far as they cover the requirements for admission to the course desired.

By School Certificate. Certificates from schools approved by the faculty will be accepted for graduates of the school if they

cover the requirements for admission to the course desired and contain a recommendation from the principal of the school that the candidate be admitted to college. Blank certificates, to be filled out by principals of schools, will be furnished upon application to the *Secretary of the Faculty, Union College, Schenectady, N. Y.*

So far as possible all credentials should be forwarded by July 10 of the year in which the candidate desires to enter, and it is expected that all certificates will be submitted not later than September 1st.

Students who enter the freshman class by certificate and fail to maintain their class standing are required to pass entrance examinations in the departments in which they have failed, if they apply for readmission.

Subjects Required for Admission to Each Course

Candidates for admission to the freshman class in any course must meet the requirements specified for that course. The subjects are numbered as in the general list given on pages 34-43.

The term *unit* is used in this catalogue in the sense established by the Carnegie Foundation and the College Entrance Examination Board, and means a course of 4 or 5 periods weekly throughout an academic year of the preparatory school.

A.B. Course, A. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 34.....	3 units
2. Greek: a, b c.....	See Page 39.....	3 units
3. Latin: a, b, c, d.....	See Page 39.....	4 units
5. Mathematics: a, b.....	See Page 41.....	2½ units
8. Electives.....	See Page 43.....	1½ units

Total 14 units

Ph.B. Course and A.B. Course^B. For admission to these courses the following subjects are required:

1. English: a, b.....	See Page 34.....	3 units
3. Latin: a, b, c, d.....	See Page 39.....	4 units
4. Modern Languages: a or b...	See Page 40.....	2 units
5. Mathematics: a, b.....	See Page 41.....	2½ units
7. History: a, b, c.....	See Page 42.....	2 units
8. Electives.....	See Page 43.....	½ unit

Total 14 units

B.S. Course and B.S. Course in Chemistry. For admission to these courses the following subjects are required:

1. English: a, b.....	See Page 34.....	3 units
4. Modern Languages ¹ : a or b...	See Page 40.....	2 units
5. Mathematics: a, b, c.....	See Page 41.....	3 units
6. Science.....	See Page 42.....	1 unit
7. History: c.....	See Page 42.....	1 unit
8. Electives ²	See Page 43.....	4 units
Total		14 units

¹ For the general B.S. course, Latin a-d, page 39, may be substituted for the requirement in modern languages. Latin a-d and Greek a-b, page 39, may be substituted for the requirement in modern language and electives.

² For the B.S. course in chemistry the science offered must be chemistry.

B.E. Courses. For admission to these courses the following subjects are required:

1. English: a, b.....	See Page 34.....	3 units
4. Modern Languages: a or b...	See Page 40.....	2 units
5. Mathematics: a, b, c,	See Page 41.....	3 units
6. Science.....	See Page 42.....	1 unit
7. History: c.....	See Page 42.....	1 unit
8. Electives.....	See Page 43.....	4 units
Total		14 units

Pre-Medical Course. For admission to this course the following subjects are required:

1. English: a, b.....	See Page 34.....	3 units
4. Modern Languages: a or b...	See Page 40.....	2 units
5. Mathematics: a, b, c	See Page 41.....	3 units
6. Science.....	See Page 42.....	1 unit
7. History: c.....	See Page 42.....	1 unit
8. Electives.....	See Page 43.....	4 units
Total		14 units

Advanced Standing. Candidates from other colleges must bring letters of honorable dismissal, and upon the presentation of acceptable certificates will be admitted to corresponding standing. Candidates for a degree must enter not later than the beginning of the senior year.

Requirements in Individual Subjects

1. English (3 units)

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence, and appreciation.

The following is the requirement for the years 1916-1919

Grammar and Composition

The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences, and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description, and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge, and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

Literature

The second object is sought by means of two lists of books, headed respectively *Reading* and *Study*, from which may be framed a progressive course in literature covering four years. In connection with both lists, the student should be trained in reading aloud and be encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. Reading

The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature, by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least *two* selections are to be made, except as otherwise provided under Group I.

GROUP I. Classics in Translation.

The Old Testament, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther. The Odyssey, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII. The Iliad, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI. The Aeneid. The Odyssey, Iliad and Aeneid should be read in English translations of recognized literary excellence. For any selection from this group a selection from any other group may be substituted.

GROUP II. Shakespeare

Midsummer-Night's Dream, Merchant of Venice, As You Like It, Twelfth Night, The Tempest, Romeo and Juliet, King John, Richard II, Richard III, Henry V, Coriolanus, Julius Caesar, Macbeth, Hamlet. The last three if not chosen for study under B.

GROUP III. Prose Fiction

Malory, Morte d'Arthur (about 100 pages); Bunyan, Pilgrim's Progress, Part I; Swift, Gulliver's Travels (voyages to Lilliput and to Brobdingnag); Defoe, Robinson Crusoe, Part I; Goldsmith, Vicar of Wakefield; Frances Burney, Evelina; Scott's Novels, any one; Jane Austen's Novels, any one; Maria Edgeworth, Castle Rackrent, or The Absentee; Dickens' Novels, any one; Thackeray's Novels, any one; George Eliot's Novels, any

one; Mrs. Gaskell, *Cranford*; Kingsley, *Westward Ho!* or *Here-ward the Wake*; Reade, *The Cloister and the Hearth*; Blackmore, *Lorna Doone*; Hughes, *Tom Brown's Schooldays*; Stevenson, *Treasure Island*, or *Kidnapped*, or *Master of Ballantrae*; Cooper's Novels, any one; Poe, *Selected Tales*; Hawthorne, *The House of the Seven Gables*, or *Twice Told Tales*, or *Mosses from an Old Manse*; a collection of *Short Stories* by various standard writers.

GROUP IV. Essays, Biography, etc.

Addison and Steele, *The Sir Roger de Coverley Papers*, or selections from the *Tatler* and the *Spectator* (about 200 pages); Boswell, selections from the *Life of Johnson* (about 200 pages); Franklin, *Autobiography*; Irving, selections from the *Sketch Book* (about 200 pages), or *Life of Goldsmith*; Southey, *Life of Nelson*; Lamb, selections from the *Essays of Elia* (about 100 pages); Lockhart, selections from the *Life of Scott* (about 200 pages); Thackeray, lectures on Swift, Addison and Steele in the *English Humorists*; Macaulay, any one of the following essays: *Lord Clive*, *Warren Hastings*, *Milton*, *Addison*, *Goldsmith*, *Frederic the Great*, *Madame d'Arblay*; Trevelyan, selections from the *Life of Macaulay* (about 200 pages); Ruskin, *Sesame and Lilies*, or *Selections* (about 150 pages); Dana, *Two Years before the Mast*; Lincoln, *Selections*, including at least the two *Inaugurals*, the *Speeches in Independence Hall* and at *Gettysburg*, the *Last Public Address*, the *Letter to Horace Greeley*, together with a brief memoir or estimate of Lincoln; Parkman, *The Oregon Trail*; Thoreau, *Walden*; Lowell, *Selected Essays* (about 150 pages); Holmes, *The Autocrat of the Breakfast Table*; Stevenson, *An Inland Voyage and Travels with a Donkey*; Huxley, *Autobiography* and selections from *Lay Sermons*, including the addresses on *Improving Natural Knowledge*, *A Liberal Education*, and *A Piece of Chalk*; a collection of *Essays* by Bacon, Lamb, DeQuincey, Hazlitt, Emerson, and later writers; a collection of *Letters* by various standard writers.

GROUP V. Poetry

Palgrave's *Golden Treasury* (First Series), Books II and III, with special attention to Dryden, Collins, Gray, Cowper, and

Burns; Palgrave's Golden Treasury (First Series), Book IV, with special attention to Wordsworth, Keats, and Shelley (if not chosen for study under B); Goldsmith, *The Traveller* and *The Deserted Village*; Pope, *The Rape of the Lock*; a collection of English and Scottish Ballads, as, for example, some Robin Hood ballads, *The Battle of Otterburn*, *King Estmere*, *Young Beichan*, *Bewick* and *Grahame*, *Sir Patrick Spens*, and a selection from later ballads; Coleridge, *The Ancient Mariner*, *Christabel*, and *Kubla Khan*; Byron, *Childe Harold*, Canto III or IV, and *The Prisoner of Chillon*; Scott, *The Lady of the Lake*, or *Marmion*; Macaulay, *The Lays of Ancient Rome*, *The Battle of Naseby*, *The Armada*, *Ivry*; Tennyson, *The Princess*, or *Gareth and Lynette*, *Lancelot and Elaine*, and *The Passing of Arthur*; Browning, *Cavalier Tunes*, *The Lost Leader*, *How They Brought the Good News from Ghent to Aix*, *Home Thoughts from Abroad*, *Home Thoughts from the Sea*, *Incident of the French Camp*, *Hervé Riel*, *Pheidippides*, *My Last Duchess*, *Up at a Villa—Down in the City*, *The Italian in England*, *The Patriot*, *The Pied Piper*, "*De Gustibus*"—, *Instans Tyrannus*; Arnold, *Sohrab and Rustum*, and *The Forsaken Merman*; selections from American Poetry, with special attention to Poe, Lowell, Longfellow, and Whittier.

B. Study

This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

GROUP I. Drama

Shakespeare, *Julius Caesar*, *Macbeth*, *Hamlet*.

GROUP II. Poetry

Milton, *L'Allegro*, *Il Penseroso*, and either *Comus* or *Lycidas*; Tennyson, *The Coming of Arthur*, *The Holy Grail*, and *The Passing of Arthur*; the selections from Wordsworth, Keats, and Shelley in Book IV of Palgrave's Golden Treasury (First Series).

GROUP III. Oratory

Burke, Speech on Conciliation with America; Macaulay's two Speeches on Copyright and Lincoln's Speech at Cooper Union; Washington's Farewell Address and Webster's First Bunker Hill Oration.

GROUP IV. Essays

Carlyle, Essay on Burns, with a selection from Burns's Poems; Macaulay, Life of Johnson; Emerson, Essay on Manners.

Examination

Any examination set will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

However accurate in subject-matter, no paper can be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading. For this purpose the examiner will provide several subjects, perhaps eight or ten, from which the candidate may make his own selections. He will not be expected to write more than four hundred words per hour.

The examination in literature will include:

a. General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under *A. Reading*, above. The candidate will be required to submit a list of the books read in preparation for the examination, certified by the principal of the school in

which he was prepared; but this list will not be made the basis of detailed questions.

b. A test on the books prescribed for study, which will consist of questions upon their content, form, and structure, and upon the meaning of such words, phrases, and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

2. Greek (2 units)

a. **Grammar and Composition** (1 unit). The common forms, idioms, and constructions, and the general grammatical principles of Attic Greek prose. Translation into Greek of detached sentences and very easy continuous prose based upon the *Anabasis*.

b. **Xenophon and Sight Translation** (1 unit). The first three books of the *Anabasis*.

c. **Homer** (1 unit). The first three books of the *Iliad* (omitting II, 494-end) or an equivalent amount of the *Odyssey*, and the Homeric constructions, forms, and prosody.

3. Latin (4 units)

a. **Grammar and Composition** (1 unit). The inflections; the simpler rules for composition and derivation of words; syntax of cases and the verb; structure of sentences in general, with particular regard to relative and conditional sentences, indirect discourse, and the subjunctive. Translation into easy Latin of detached sentences and very easy continuous prose based upon Caesar and Cicero.

b. **Caesar** (1 unit). Any four books of the *Gallic War*.

c. **Cicero** (1 unit). Any six orations from the following list, or equivalents: The four orations against Catiline, Archias, The Manilian Law, Marcellus, Roscius, Milo, Sestius, Ligarius, the fourteenth Philippic.

d. **Vergil** (1 unit). The first six books of the *Aeneid*, and so

much prosody as relates to accent, versification in general, and dactylic hexameter.

Equivalents in b, c, or d, will be accepted at the discretion of the head of the department.

Every student is required to use in the college class room the Roman Method of pronunciation, and is expected to have had practice in this method at school.

4. Modern Languages (2 units)

a. German (2 units). Two years' work will be necessary to meet this requirement.

During the first year the work should comprise: 1. careful drill upon pronunciation; 2. the memorizing and frequent repetition of colloquial sentences; 3. drill upon the rudiments of grammar, that is, upon the inflection of the article, of such nouns as belong to the language of every-day life, of adjectives, pronouns, weak verbs, and the more usual strong verbs; also upon the use of the more common prepositions, the simpler uses of the modal auxiliaries, and the elementary rules of syntax and word-order; 4. abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; 5. the reading of from 75 to 150 pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson, the teacher giving the English, and in reproducing from memory sentences previously read.

During the second year the work should comprise: 1. the reading of from 150 to 250 pages of literature in the form of stories and plays; 2. accompanying practice, as before, in the translation into German of easy variations upon the matter read and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; 3. continued drill upon the rudiments of the grammar, with constant applications in the construction of sentences.

b. French (2 units). Two years' work will be necessary to meet this requirement.

During the first year the course should include: 1. careful

drill in pronunciation; 2. the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural nouns, the inflection of adjectives, participles, and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence and the elementary rules of syntax; 3. abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; 4. the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice of translating into French easy variations of the sentences read, the teacher giving the English, and in reproducing from memory sentences previously read; 5. writing French from dictation.

During the second year the work should comprise: 1. the reading of from 250 to 400 pages of easy modern prose in the form of stories, plays, or historical or biographical sketches; 2. constant practice, as in the previous year, in translating into French easy variations upon the texts read; 3. frequent abstracts, sometimes oral and sometimes written, or portions of the text already read; 4. writing French from dictation; 5. continued drill upon the rudiments of grammar, with constant application in the construction of sentences; 6. mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

5. Mathematics ($2\frac{1}{2}$ units; 3 units)

a. **Algebra.** ($1\frac{1}{2}$ units). The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions, ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and of numbers; exponents, including the fractional and negative.

Simple cases of equations with one or more unknown quan-

tities that can be solved by the methods of linear or quadratic equations.

Problems depending upon quadratic equations.

The binomial theorem for positive integral exponents.

The formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

b. Plane Geometry (1 unit). The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle.

The solution of numerous original exercises, including loci problems.

Application to the mensuration of lines and plane surfaces.

c. Solid Geometry ($\frac{1}{2}$ unit). The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms; pyramids, cylinders, and cones; the sphere and the spherical triangle.

The solution of numerous original exercises, including loci problems.

Applications to the mensuration of surfaces and solids.

6. Science (1 unit)

The work in science may be offered in any of the departments named below. The figure in parenthesis shows the unit value:

- a. Physics (1)
- b. Chemistry (1)
- c. Biology (1)
- d. Zoology (1)
- e. Botany (1)

In every instance the work expected is that outlined for the given subject in the reports of the College Entrance Examination Board and the Carnegie Foundation, or in the Syllabus of the New York State Education Department.

7. History (1 unit; 2 units)

- a. **Greek History** ($\frac{1}{2}$ unit.) In this study must be included the geography of ancient Greece.

b. Roman History ($\frac{1}{2}$ unit). In this study must be included the geography of the Roman Empire.

c. History of the United States (1 unit).

Elementary United States history will be accepted if the candidate presents in addition a year of history not otherwise required.

8. Electives ($\frac{1}{2}$ unit; $1\frac{1}{2}$ units; 4 units)

In completing the requirements for admission to each course a fixed number of elective units in subjects not already taken from other groups must be offered from the list below.

In every instance the work expected is that outlined for the given subject in the reports of the College Entrance Examination Board and the Carnegie Foundation, or in the Syllabus of the New York State Education Department.

For admission to the A. B. course.....	$1\frac{1}{2}$ units
For admission to the Ph. B. course.....	$\frac{1}{2}$ unit
For admission to the B. E. course.....	4 units
For admission to the B. S. course.....	4 units

The figure in parenthesis after each subject shows the unit value of that subject.

Greek: 2, 3..... (2, 3)	Roman History ($\frac{1}{2}$)
Latin: 2, 3, 4... (2, 3, 4)	English History (1)
French: 1, 2, 3.. (1, 2, 3)	History of English Literature... ($\frac{1}{2}$)
German: 1, 2, 3. (1, 2, 3)	Plane Trigonometry ($\frac{1}{2}$)
Spanish 2 (2)	Spherical Trigonometry ($\frac{1}{2}$)
Civics ($\frac{1}{2}$)	Drawing (1)
Physics (1)	Zoology (1)
Chemistry (1)	Botany (1)
Physiology ($\frac{1}{2}$)	Physiography (1)
Biology (1)	Commercial Law ($\frac{1}{2}$)
Greek History ($\frac{1}{2}$)	Commercial Geography ($\frac{1}{2}$)

Entrance Examinations in 1917

Entrance examinations will be held at the college in June and in September, in accordance with the schedule given below. A fee of five dollars is required at the time of registration.

Only those who register at the appointed time will be admitted to the examinations of the following days.

Schedule of the June Examinations*Thursday, June 14*

8.30 A. M. Candidates register at the office of the secretary

English a	Page 35	9 A. M. to 11 A. M.
English b	" 37	11 A. M. " 1 P. M.
Mathematics a	" 41	2 P. M. " 4 P. M.
Mathematics b, c	" 42	4 P. M. " 6 P. M.

Friday, June 15

Greek, Latin	Page 39	9 A. M. to 11 A. M.
French, German	" 40	11 A. M. " 1 P. M.
History	" 42	2 A. M. " 4 P. M.
Science	" 42	4 P. M. " 6 P. M.

Schedule of the September Examinations*Monday, September 17*

9 A. M. Candidates register at the office of the secretary.

Tuesday, September 18

English a	Page 35	9 A. M. to 11 A. M.
English b	" 37	11 A. M. " 1 P. M.
Mathematics a	" 41	2 P. M. " 4 P. M.
Mathematics b, c	" 42	4 P. M. " 6 P. M.

Wednesday, September 19

Greek, Latin	Page 39	9 A. M. to 11 A. M.
French, German	" 40	11 A. M. " 1 P. M.
History	" 42	2 P. M. " 4 P. M.
Science	" 42	4 P. M. " 6 P. M.

DEPARTMENTS OF INSTRUCTION

NON-TECHNICAL

The Greek Language and Literature

PROFESSOR BENNETT AND ASSISTANT PROFESSOR FOBES

The courses leading to the degree of bachelor of arts at Union College are classical courses, Greek as well as Latin being required of all candidates for that degree. Two courses are offered. Greek is required for admission to course A and during the freshman and sophomore years. In course B Greek is begun on entrance and required to the end of the sophomore year. Except English composition all studies are elective for classical students in the junior and senior years, and may be chosen in any of the main departments of knowledge taught. The modern languages taken in the freshman and sophomore years may be continued and other modern languages begun. Preparation to meet requirements of medical colleges in science may be made by election. Course B as given prior to 1915-1916 is continued for students already entered in it.

The aim of the formal instruction in Greek is to impart an exact knowledge of the Greek language and a thorough acquaintance with a few good Greek books. The books read are varied from year to year; but the sophomore courses are always in history and afford an introduction to the elective courses in history offered in the junior and senior years. Collateral reading in history, archaeology, art, language, and literature is required of all students in Greek and is tested by examination. English composition is taught in connection with the study of Greek in the freshman year.

The courses for the year 1916-1917 are as follows:

1. **Homer:** Iliad XXII and XXIV; Odyssey VI and IX. **Xenophon:** Selections from the Memorabilia. **Plato:** The Apology, the Crito, and selections. **Greek Composition.** **History:** Oman's History of Greece. **English Composition:** Exercises in idiomatic translation; essays on classical subjects; essays on the author assigned for study in competition for the Van Orden Prize.

Required of freshmen in course A. Five hours weekly throughout the year.

1a. Goodell's *The Greek in English*. Ball's *The Elements of Greek*. **Xenophon**: *Anabasis* I and selections. **History and English Composition** as in 1.

Required of freshmen in course B. Five hours weekly throughout the year.

2. **Herodotus**: Books VII and VIII. **Thucydides**: Book II. **Demosthenes**: *Philippics* I-III. **Greek Composition**. **History**: Pelham's *Outlines of Roman History*; Seignobos's *History of Mediaeval and Modern Civilization*; Hogarth's *Philip and Alexander of Macedon*; Jebb's essay on *Demosthenes*.

Required of sophomores in course A. Four hours weekly throughout the year.

2a. **Xenophon**: *Anabasis* I and selections. **Herodotus**: Books VII and VIII. **Greek Composition**. **History**: Pelham's *Outlines of Roman History*; Seignobos's *History of Mediaeval and Modern Civilization*.

Required of sophomores in course B. Four hours weekly throughout the year.

3. **Homer**. Selected books of the *Iliad* and the *Odyssey*, and selected hymns. Jebb's *Introduction to Homer*. Dickinson's *The Greek View of Life*. Tarbell's *History of Greek Art*.

Elective for juniors in course A. Three hours weekly throughout the year.

3a. **Plato**: *The Apology*, the *Crito*, and selections. **Demosthenes**: *Philippics* I-III. **Euripides**: *The Medea*. **Greek Composition**. Dickinson's *The Greek View of Life*. Butcher's *Some Aspects of the Greek Genius*. Hogarth's *Philip and Alexander of Macedon*. Jebb's essay on *Demosthenes*.

Required in course B of second year students in Greek of the class of 1918. Three hours weekly throughout the year.

3b. Salomon Reinach's *Eulalie*. Ball's *The Elements of Greek*. **Xenophon**: *Anabasis* I and selections. Dickinson's *The Greek View of Life*. Butcher's *Some Aspects of the Greek Genius*. Tarbell's *History of Greek Art*.

Required in course B of first year students in Greek of the class of 1918. Three hours weekly throughout the year.

4. Xenophon: Anabasis I and II. **Plato:** The Apology, the Crito, and selections. **Homer:** Iliad I and II; Odyssey VI and IX. **Demosthenes:** Philippic III. Dickinson's The Greek View of Life. Butcher's Some Aspects of the Greek Genius. Jebb's Introduction to Homer, chapters I-III. Hogarth's Philip and Alexander of Macedon.

Required of students in course B of the class of 1917. Three hours weekly throughout the year.

The senior A elective course and the senior course for candidates for honors in Greek are omitted in 1917-1918.

The Latin Language and Literature

PROFESSOR KELLOGG

The studies of this department are required, in the freshman and sophomore years, of all students who are candidates for either one of the two degrees, A. B. and Ph. B. In the junior and senior years Latin becomes an elective study, except for students who are candidates for honors in Latin; of them it is required.

1. Livy: Selections from Books I, XXI and XXII. Roman history. **Tacitus:** Agricola and Germania. **Cicero:** De Senectute or De Amicitia or Selected Letters. Latin composition.

The work of the first year includes a thorough review of forms and syntax through oral and written prose composition and sight reading. Selections from the three great masters of Roman prose are made the basis for grammatical and literary analysis and interpretation, and also, through lectures and assigned reading, for the study of Roman history through the reign of Trajan.

Required of freshmen in the A. B. and Ph. B. courses, and of students in the B. S. course who offer Latin for entrance. Four hours weekly throughout the year.

2. Selections from Latin Poetry. **Terence:** *Adelphoe*. **Plautus:** *Menaechmi* or an equivalent. **Horace:** Selected Odes and Epodes. **Catullus:** Selected poems.

Through lectures on ancient comedy and lyric, and by collateral reading, the student is made acquainted with the history of Roman literature under the Republic and the Empire. The grammatical analysis aims to make familiar the chief characteristics of early and colloquial Latin, and the general economy of poetic diction. The literary interpretation centers chiefly around the influence of Greek life and thought on Roman literature, and the national and personal elements in Latin poetry.

Required of sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

3. Horace (*Satires* and *Epistles*) and **Juvenal**. **Pliny the Younger** or **Cicero** (*Letters*), or **Martial** (*Epigrams*) or **Petronius** (*Trimalchio's Dinner*).

This course, through lectures and assigned reading, continues the history of Roman literature under the Empire. A brief introduction to Roman archaeology (with special study of the Forum Romanum) is given, and in connection with the Pliny, an outline of the private life of the Romans.

Students able to read French or German may receive special assignments under the direction of the department.

Elective for juniors in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

4. Lucretius: Books I and III or V and Selections, with lectures on didactic poetry, the atomic theory, and the philosophic system of Epicurus. The literature of the Empire is illustrated by readings from **Seneca** (*Moral Epistles*) or **Quintilian** (Book X on literary criticism) or **Suetonius** (*Lives of Julius Caesar and Augustus*) or **Martial** (*Selected Epigrams*).

As this course is not only for those who elect to study Roman life and literature but also for those who may desire to use Latin in teaching or as an instrument in later research work, special assignments are given from authors or inscriptions for practice in editing, or the writing of history from the sources.

Elective for seniors in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

5. **Roman Law.** When a sufficient number of seniors electing course 4 desire it, one or both semesters may be devoted to an introduction to Roman Law, based on the Institutes of Justinian, Robinson's Selections from Roman Law, and Morey's Outlines of Roman Law.

6. **Honor Course.** Studies in the life and works of Vergil. Open to seniors who have complied with the requirements for special honors. Three hours weekly throughout the year.

In general, subsidiary reading will be recommended. Equivalents may be substituted in the elective programme at any time, and the order of the subjects as given above may be altered in any one of the four years at the discretion of the head of the department.

Modern Languages

PROFESSOR BARNES, ADJUNCT PROFESSOR MARCH,
ASSISTANT PROFESSOR STEWART, MR. MELAMET,
AND MR. BROWN

The courses in German, French, and Spanish have a twofold object, to give the student such control of the language that he may be able to use it as an instrument in study and research, and to open to him another path to general training and culture. They aim to enable him to read modern texts without translation and to give him some facility in the independent use of the language. In the academic courses the literary side of the study is made prominent; in the engineering division emphasis is laid on those phases of the language which are peculiar to technical and scientific writing. From the beginning the language studied is made so far as possible the language of the class room.

1. **German 1.** Grammar and reading; drill on inflection and the more usual constructions, with special attention to pronunciation and vocabulary. Reading of elementary scientific texts.

Required in the B. E. course of freshmen who offer French at entrance. Three hours weekly throughout the year.

2. German 1a. Grammar for review and reference; exercises in syntax; practice in writing German. The reading of the class is mainly in Scientific German, but other matter is also read and suitable selections are assigned for outside study and made the basis of tests and themes. In any year the equivalent of at least two of the following scientific works and one of the others are read.

Wallentin: Grundzüge der Naturlehre

Du Bois-Reymond: Wissenschaftliche Vorträge

Lassar-Cohn: Die Chemie im täglichen Leben

Müller: Die elektrischen Maschinen

Hauff: Lichtenstein; Freytag: Das Nest der Zaunkönige, Soll und Haben; Sudermann: Frau Sorge; Storm: Der Schimmelreiter; Meyer: Das Amulett, Der Heilige.

Required of freshmen in the A. B. course B and in the B. E. course who offer German for entrance. Three hours weekly throughout the year.

3. German 1b. Grammar for review and reference, with exercises and drill on syntax; writing and reproduction, with colloquial practice and work in vocabulary building based on a course in German composition. Reading and discussion of works selected from the classics, from nineteenth century drama and fiction, and from historical writings. In general one or more works from each of at least four of the following groups will be read:

Lessing: Minna von Barnhelm, Emilia Galotti

Goethe: Götz von Berlichingen, Egmont

Schiller: Maria Stuart, Die Jungfrau von Orleans

Freytag: Die Journalisten; Moser: Der Bibliothekar; Ernst: Flachsmann als Erzieher.

Chamisso: Peter Schlemihl; Ludwig: Zwischen Himmel und Erde; Hauff: Lichtenstein; Freytag: Soll und Haben; with others to be assigned for outside reading.

Sybel: Die Erhebung Europas gegen Napoleon; Ranke: Kai-

serwahl Karls des V; Freytag: Bilder aus der deutschen Vergangenheit (selections); Schiller: Egmonts Leben und Tod.

Required in the Ph. B. and B. S. courses of freshmen who offer German for entrance. Five hours weekly throughout the year.

Sophomores who offer French for entrance but have also had two years of German take this course in place of German 2.

4. German 2. A course in grammar, composition and reading; easy selections in prose and poetry, historical matter, a novel and a play are read. While thorough preparation and careful drill are insisted upon throughout, the amount of reading demanded is considerable.

Required in the A. B. course A and in the Ph. B. and B. S. courses of sophomores who offer French at entrance. Alternate with French for sophomores in the A. B. course B. Five hours weekly throughout the year.

5. German 3. Grammar reviewed and continued, with chief attention to case and verb construction, idioms, and the translation of English into German; reading for vocabulary based on a colloquial novel; rapid reading of selected works. In general one or more books from each of the following groups will be read.

Schiller: Wilhelm Tell, Historische Skizzen

Goethe: Götz von Berlichingen, Hermann und Dorothea

Sudermann: Frau Sorge, Der Katzensteg

Elective in the A. B., Ph. B. and B. S. courses for juniors who have passed German 2 with a grade of 80 or more, or German 1b with a grade between 70 and 85. Three hours weekly throughout the year.

6. German 3a. Course (a) below and one of the others, or parts of two or more of them:

a) Advanced composition, with short independent essays; studies in words and their uses, with some drill on derivations and etymology; journalistic German, with sight readings from current newspapers and periodicals.

b) A study of some of the more recent prose literature, es-

pecially the novel; works of Storm, Keller, Meyer, Sudermann, and others.

c) A continuation of the classics begun in German 1b; reading and discussion of additional works of Lessing, Schiller and Goethe; Biedermann: *Deutsche Bildungszustände im 18. Jahrhundert*.

d) An intensive study of Schiller's life and works.

e) A course of reading in nineteenth century drama, with special attention to Kleist, Hebbel, Grillparzer and Hauptmann.

Elective in the Ph. B. and B. S. courses for juniors who have passed German 1b with a grade of 85 or more. Three hours weekly throughout the year.

7. German 4. Language and literature.

a) Advanced composition, with independent themes based on the reading of course (c) below.

b) Kochs *Geschichte der deutschen Literatur* as a handbook, with lectures, and references to other works.

c) A study of the classical period; Lessing, Goethe and Schiller are discussed in this order and chief attention is given to the following works:

Lessing: *Emilia Galotti*, *Nathan der Weise*

Goethe: *Faust I* (with readings on the Faust legend)

Schiller: *Maria Stuart*, *Jungfrau von Orleans*, *Wallenstein* (with this are read selections from *Der 30-jährige Krieg*)

Elective in the A. B., Ph. B. and B. S. courses for seniors who have passed German 3 with a grade of 80 or German 3a with a grade between 70 and 85. Three hours weekly throughout the year.

8. German 4a. Course (a) below and one of the others, or parts of two or more of them.

a) Advanced composition, with original themes on subjects connected with the reading of the course.

b) A study of Goethe's life and works, with readings from *Dichtung und Wahrheit*, and the poems; *Egmont* (with this is read Schiller's *Egmonts Leben und Tod*), *Iphigenie auf Tauris*, *Torquato Tasso*; *Faust I*, with readings on the Faust legend in literature.

c) A history of German literature, based on Kluges *Geschichte der deutschen National-Literatur*, with assigned studies and parallel readings from an anthology.

d) A course in Middle High German, based on a text-book, with supplementary exercises from other sources.

Elective in the Ph. B. and B. S. courses for seniors who have passed German 3a with a grade of 85 or more. Three hours weekly throughout the year.

9. **French 1.** A beginners' course in grammar and reading, with special attention to pronunciation, vocabulary, and the common forms and idioms. Reading of texts suited to the progress of the class.

Required of freshmen in the A. B. course A and of freshmen in the B. E. course who offer German at entrance. Three hours weekly throughout the year.

10. **French 1a.** A rapid review of the elements of grammar, and the study of syntax and composition; practice in pronouncing and reading French, by means of reading, dictation, and some conversation; careful translation. In 1915-16 one or more books will be read from each of the following groups:

Daudet: *Tartarin de Tarascon*.

Buffum: *French Short Stories*.

Dumas: *La Tulipe Noire*; Feuillet: *Le Roman d'un Jeune Homme Pauvre*; Hugo: *Hernani*; La Brète: *Mon Oncle et mon Curé*; Labiche et Delacour: *La Cagnotte*; Sand: *La Petite Fadette*.

Required of freshmen in the A. B. course B and in the B. E. course who offer French at entrance. Three hours weekly throughout the year.

11. **French 1b.** This course is like 1a, but includes a wider range of reading, so as to give a general view of the history of French literature. Among the additional books that are read may be:

Corneille: *Le Cid*; Molière: *l'Avare*; Racine: *Athalie*; Bossuet: *Selections*; Le Sage: *Gil Blas*; Beaumarchais: *Le Barbier*

de Seville; and selections from Masson's *La Lyre Française* and Lanson's *Histoire de la Litterature Française*.

Required in the Ph. B. and B. S. course of freshmen who offer French for entrance. Five hours weekly throughout the year.

Sophomores who offer German for entrance but have also had two years of French take this course in place of French 2.

12. French 2. A beginners' course in grammar and reading. This course is similar to French 1, but includes more work in composition and reading. The reading may include:

Halévy: *L'Abbé Constantin*; Sand: *La Mare au Diable*; *La Biche et Martin*; *Le Voyage de M. Perrichon*.

Required in the Ph. B. and B. S. course of sophomores who offer German at entrance. Alternate with German for sophomores in the A. B. course B. Five hours weekly throughout the year.

13. French 3. Grammar reviewed; exercises in vocabulary, idioms and the spoken French in connection with Daudet's *Tartarin de Tarascon*. This work is followed by composition and reading. The books read may be:

Zola: *La Débâcle*; Souvestre: *Un Philosophe sous les Toits*; De Musset: selections.

Elective in the A. B., Ph. B. and B. S. courses for juniors who have passed French 2 satisfactorily, or French 1b with a grade of not less than 80. Three hours weekly throughout the year.

14. French 3a. A reading course in nineteenth century literature. Lanson's *Histoire de la Litterature Française* is followed and discussed, and a considerable amount of modern French is read out of class and reported upon. The college library is called into use, and the student should gain some real acquaintance with certain of the modern authors. One hour a week is given to advanced composition, including translations and the writing of themes.

Elective in the Ph. B. and B. S. courses for juniors who have passed French 1b with a grade of 85 or more. Three hours weekly throughout the year.

15. French 4. This course is devoted to the study of some

of the classics of the seventeenth century. Selected works of Corneille, Racine, Molière, La Fontaine, and Bossuet are read, together with parts of Lanson's *Histoire de la Littérature Française*. One hour a week is devoted to syntax and composition.

Elective in the A. B., Ph. B. and B. S. courses for seniors who have passed French 3. Three hours weekly throughout the year.

16. French 4a. This course is devoted to the study of Molière, his life, his works, and his age.

Elective in the Ph. B. and B. S. courses for seniors who have passed French 3a satisfactorily. Three hours weekly throughout the year.

17. Spanish 3. Grammar and translation. Commercial selections and newspapers, a recent novel, and a modern play are read.

Elective for juniors in the A. B., Ph. B. and B. S. courses and to seniors in those courses who have not had Spanish in junior year. Three hours weekly throughout the year.

18. Spanish 4. Grammar and composition. One or two dramas of the classical period and one or two modern plays are read, together with some works of recent fiction.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have had Spanish 1. Two hours weekly throughout the year.

The English Language and Literature

PROFESSOR HALE, ASSISTANT PROFESSOR CHASE, AND MR. WHIPPLE

The work of the department includes the study of rhetoric, literature, and the earlier forms of the language. Instruction in argumentation and public speaking is given in another department.

1. Rhetoric and Composition. The aim of this course is to train the student in the use of clear and correct English, written and spoken. The work consists in the study of rhetorical principles and practice in composition. In 1916-17 Slater's *Freshman Rhetoric* and Woolley's *Handbook of Composition* were used as text-books. A certain amount of outside reading

from English authors is also assigned. Usually, two short themes a week are required, and at intervals of six weeks longer themes. Each student meets the instructor in personal conferences for advice about his individual work.

Required of freshmen. Three hours weekly throughout the year in the Ph. B. and B. S. courses; two hours weekly throughout the year in the B. E. courses.

2. Essays. The practice of English composition is carried on throughout the course. As a rule two essays a semester are written, which are corrected and criticised in individual conferences with the instructor.

Required of sophomores, juniors and seniors in all courses. The requirement for senior engineers includes but one literary essay each semester.

3. Introduction to English Literature. This is a course of general reading aiming to acquaint the student with some of the masterpieces of English literature, to train him in the habit of careful reading, and to serve as a basis for more advanced study. The program is as follows: In the first semester the subject is the literature of the Elizabethan era, chiefly as seen in the plays of Shakespeare. In 1916-17 Hamlet was read with care, and several other plays in a more cursory manner. Thorndike and Neilson's Facts about Shakespeare is used for reference and additional information. In the second semester the subject is the age of Anne, first, as seen in Thackeray's Henry Esmond, and afterward as shown in the literature of the time.

Required of sophomores in all courses. Three hours weekly throughout the year in the A. B., Ph. B. and B. S. courses, and two hours weekly throughout the year in the B. E. courses.

4. Nineteenth Century Literature. Certain leading men of letters are studied as representative of the life and thought of their age. The subject matter of the course varies from year to year. Two of the following groups are ordinarily selected:

a) Poets of the nineteenth century, with special study of Byron, Wordsworth, Shelley, Keats, Tennyson, and Browning.

b) The Victorian Novel: The reading consists of six novels dealing with different phases of nineteenth century life, as, for

instance, *Pickwick Papers*, *Vanity Fair*, *Cranford*, *Mill on the Floss*, *The Ordeal of Richard Feverel*, *Far from the Madding Crowd*.

c) Victorian prose, with especial study of Carlyle, Newman, Ruskin, and Arnold.

d) American literature of the middle nineteenth century.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

5. **Early English Literature.** The *Canterbury Tales* are read and as much of Chaucer's other work as time permits. There is a certain amount of linguistic study, which is necessary for an intelligent reading of the text; but the end in view is an understanding of Chaucer's literary skill and his relations to the age in which he lived.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

7. **Modern English Literature.** A study of the English and American literature of the last half century: its object is to give the student an idea of modern points of view. In 1916-17 the course dealt with fiction, the drama, and poetry.

Elective for seniors in the A. B., Ph. B., and B. S. courses. Three hours weekly throughout the year.

Honor Course. Students who desire to be candidates for special honors should consult the instructor in the department early in the second semester of junior year.

Rhetoric and Public Speaking

PROFESSOR MCKEAN

10. **Sophomore Orations.** The work consists of three distinct parts: (a) formal lectures upon the art of public speaking, tog ther with abundant illustrations and class practice upon the principles involved; (b) the writing of orations under individual criticism; (c) the delivery of these orations before the class, subject to further criticism for both individual and general instruction. Supplemental to this work, still further individual criticism and instruction, based on personal needs, is given all

students who enter the various contests regularly held under the auspices of the department.

Required of sophomores in all courses. One hour weekly throughout the year.

11. **Junior Orations.** The work is like that of course 10, but of an advanced character.

Required of juniors in all courses. One hour weekly throughout the year.

12. **Senior Orations.** The work is like that of course 10, but of a more advanced character.

Required of seniors in the A. B., Ph. B. and B. S. courses. One hour weekly throughout the year.

13. **Argumentation and Debate.** The work consists of two distinct parts: (a) the study of the theory of argumentation and debate, based upon a text-book, and pursued by means of recitations, criticisms, discussions, and informal lectures; and (b) practice in the analysis of subjects for debates, in the preparation of briefs and arguments, and in the more formal debates of the class room. Considerable attention is given to parliamentary law, and practice is afforded in the conduct of business sessions.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

14. **Advanced Argumentation and Debate.** The work is of a more advanced character than that in course 13, and consists of class-room debates; of the discussion of such practical problems as naturally grow out of this work; and of the formal presentation of oral theses, subject to individual criticism and general discussion.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have completed course 13. Three hours weekly throughout the year.

15. **Honor Course.** Open to seniors who have complied with the requirements for special honors. Two hours weekly throughout the year.

History and Government

PROFESSOR RIPTON, MR. WALDRON, AND MR. GALPIN

The work of the department covers three years, beginning with the first term of the sophomore year. The instruction is given by text-book, by lectures, and by library references.

1. **Medieval and Modern History.** The course begins with a brief study of the Roman Empire and the contribution of the ancient world to modern civilization. Attention is given to events which have had permanent influence upon the historical development of Europe, and to institutions of enduring importance; among these may be named the medieval church, the feudal institutions, the French monarchy, and the English constitution. The course is designed to form a foundation of historical knowledge which may serve as a preparation for any further study, and to give to the student some acquaintance with methods of historical study and the use of authorities and sources.

Required of sophomores in the Ph. B. and B. S. courses, and of juniors in the B. E. course, Option B. Three hours weekly throughout the year.

2. **American History.** A study is made of the period of American discovery and exploration and of the colonial period. The main part of the work, however, begins with an examination of the causes of the American Revolution. The course is guided by text-books and lectures, and much work is done in the library among the sources and authorities.

Elective for seniors and juniors in A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year. Required of juniors in the B. E. courses, except in Option B. Two hours weekly throughout the year.

3. **French Revolution and Nineteenth Century.** This course considers the causes, ideas and progress of the French Revolution and the reconstruction of European politics and society produced by the revolutionary and Napoleonic wars. Attention is then directed to the development of the spirit of nationality, especially in Italy and Germany, and a careful study is made of the

political, economic and social progress of Great Britain and the continental states. The course is designed to give a clear understanding of conditions in Europe to-day and the historical processes by which they were brought about.

Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

4. English History. A general survey of the history of England with emphasis on the rise and growth of the Anglo-Saxon system of self-government and the formation of the British Empire of today.

The course is designed to acquaint the student with the methods of historical study and includes a certain amount of collateral reading.

Elective for juniors in the A. B., Ph. B., and B. S. courses. Three hours weekly throughout the year.

5. Comparative Politics. A comparative study is made of the constitutions and governments of England, the United States, and the principal nations of continental Europe. Sufficient attention is given to historical origins to account for characteristic differences, but the work consists mainly of a systematic study of the constitutions, their adoption and methods of amendment, the distribution of governmental powers, and their practical operation, including some account of political parties.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Required of seniors in the B. E. course, Option B. Three hours weekly throughout the year.

6. International Law and International Relations. Planned to follow the study of the international relations of the European powers, given in History 3, this course provides a study of the nature of international law, its principles and rules as they have been accepted by the nations of the world, and its continuing historical development.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

7. Honor Course. This course consists of a discussion of the principles of historical criticism, together with a study of the

principal English and American historians. Essays and a thesis required.

Open to seniors who have complied with the requirements for special honors. Three hours weekly throughout the year.

The Bible

PROFESSOR ELLERY

The object of this course is not to acquaint the student with books about the Bible, but with the contents of the Bible itself. The only textbook recommended and used in the classroom is the Bible. The course is divided into two parts covering the entire Bible, and each part will be given in alternate years.

In the college year 1917-18 the following books will be studied:

Genesis: The formation of a nation

Exodus, Leviticus, Numbers: The migration of a nation

Deuteronomy: Orations and songs of Moses

Joshua, Judge, Ruth: A nation's transition to secular government

First Samuel, Second Samuel, First Kings, Second Kings: A nation under theocratic and secular government

Chronicles, Ezra, Nehemiah: The ecclesiastical history of a nation

The Books of the Prophets

In the college year 1918-19 the following books will be studied:

Esther: A story of the exiled nation

Job: A drama of the mystery of suffering

The Psalms, Lamentations, The Song of Solomon: Bible poetry

The Four Gospels, The Epistles, The Revelation

Elective for juniors and seniors in all courses. Three hours weekly throughout the year.

Philosophy

PROFESSOR HOFFMAN

The courses in this department begin with the first semester of the junior year and extend through the entire senior year. Logic, elementary psychology and elementary ethics come in the junior

year. The more advanced courses, with special studies in philosophy, are taken up in the senior year. Instruction in the various studies of the department is usually given by means of lectures, discussions, and the use of a text-book.

1. **Logic.** This study is confined to the simple elements of the science. As soon as the rules of correct thinking are mastered, the student is put at once to the analysis of arguments, the chief purpose of the study being to develop skill in detecting fallacies. Extracts from many authors are brought before the class for criticism, and so far as possible they are taken from every field of thought.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the first half of the first semester.

2. **Elementary Psychology.** This course is designed to acquaint the student with the most obvious facts of his mental experience; and the attempt is made to classify these facts into a system. The relation of psychology to the other sciences is set forth, and the importance of the study is emphasized in that it lays the foundation for all the sciences of man as a political, moral and religious being.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the first semester and the first half of the second semester.

3. **Elementary Ethics.** Only the outlines of the subject are presented in this course. The ordinary duties of man are pointed out by first describing those concerning himself and those that arise from his relation to others, to nature, and to God.

Elective for juniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the second semester.

4. **Advanced Psychology.** The chief problems discussed in this course are the recent views concerning the nature of perception, the localization of functions and the theories concerning memory, conception, the emotions and the will. The facts of abnormal psychology are also here considered, especially in-

sanity, dreams, hypnotism, telepathy, and the hypothesis of a secondary self.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the first half of the first semester.

5. Advanced Ethics. Some account of the history of ethics is given in this course, and present ethical theories are stated and discussed. The relation of ethics to other sciences is emphasized and much attention is given to the ethical problems involved in such questions as education, taxation, transportation, corporations, the treatment of criminals, the care of the poor, and the formation and dissolution of the family.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the first semester and the first half of the second semester.

6. Evolution of Religion. The object of this course is to show how religion originates and to trace out the steps taken in its development. The chief ideas of the leading religions of the heathen world are critically examined, their excellencies and defects are pointed out, and a comparison of them is made with the special doctrines of the Christian system.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second half of the second semester.

7. History of Philosophy. The attempt is made in this course to go over with considerable detail the general field of philosophy from the earliest times down to the present day. In this way the views of the principal thinkers of the world are presented and discussed upon a great variety of problems, such as the validity of knowledge, the nature of virtue, the foundations of the State and the existence of God. Much is made in this course of the historical connection of the different systems for the purpose of impressing upon the mind of the student the successive steps that have been taken in the actual development of thought.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

8. History and Philosophy of Education. This course is of-

ferred to students who intend to enter the teaching profession and who have already taken courses 1, 2, and 3.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

9. **Honors.** Advanced courses leading to special honors in this department are offered to those students who are qualified to pursue them.

Economics and Sociology

ASSISTANT PROFESSOR HILL

Courses in this department have two general purposes: one, to acquaint students with the development, processes and principles of economic and social life; the other, to provide such definite training in these subjects as the student, upon graduation, will find desirable or necessary in his practical or professional life.

The aim is to adapt method to subject in such manner that at each point of progress in study the student may attain reasonable mastery of his work. Consequently the lecture, recitation and laboratory methods are combined as much as possible. Class room work is supplemented by library assignments and such outside work as is found desirable.

1. **Economics.** A survey and descriptive study of economic life forms the substance of the first half-year's work. An analytical examination of economic consumption, production and distribution, and their guiding principles, together with the examination of a few special problems, concludes the year's study.

Elective for juniors and seniors in the A. B., Ph. B., and B. S. courses who have had History 1. Required of seniors in the B. E. course, Option B. Three hours weekly throughout the year.

2. **Economics.** This course is designed particularly for engineering students, with the purpose of familiarizing them as much as possible with such economic principles and problems as may be of practical use in daily life.

Required of seniors in the engineering courses, E. E. and G. E., Options A and C. Three hours weekly during the first semester.

3. Economics.

a) Economic History of the United States. This course includes a study of the industrial and commercial development of the country and an examination of industrial, commercial and financial problems and policies at various periods down to the present. (First semester).

b) Money and Banking. This course includes such study of the problems of money, business finance and banking as time permits. The work is both theoretical and practical. (Second semester).

Elective for seniors in the A. B., Ph. B. and B. S. courses who have had Economics 1. Three hours weekly throughout the year.

4. Sociology.

a) General Survey. A descriptive and analytical course in social evolution, organization and human association. The course aims to familiarize the student with the general characteristics and principles of social development and social activities. (First semester).

b) Social Psychology. A descriptive and analytical course on the operation of the social mind and an examination of the principles connected therewith. (Second semester).

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

5. Municipal Government. The evolution of the modern city is studied in order that the student may secure an appreciation and understanding of the problems of city life and government. This work is followed by an analytical and comparative study of municipal politics and government. The course aims to help develop efficient citizenship and to provide some training for students expecting to engage in vocations related to city life and administration. To that end, as much as possible, local governmental institutions are studied at first hand.

Elective for seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly during the second semester.

This course follows History 5 or may be substituted for Social Psychology.

Mathematics

PROFESSOR GARIS, ASSISTANT PROFESSOR GARRISON, ASSISTANT
PROFESSOR ROWLAND, MR. HUNTLEY, AND MR. TERWILLIGER

The following courses are given:

1. Freshman Mathematics.

a) Solid Geometry. In this course a large number of problems and original exercises are given in addition to the formal propositions.

b) Higher Algebra. This course begins with a review of the more important operations of elementary and intermediate algebra. It includes determinants, series, and theory of equations.

c) Plane Trigonometry. This course includes the theory of plane trigonometry; the solution of triangles; trigonometric equations and identities; De Moivre's theorem, and simple applications.

Required of freshmen in the A. B. and Ph. B. courses. Four hours weekly throughout the year.

2. Freshman Mathematics.

a) Higher Algebra. For description of course see 1b.

b) Plane Trigonometry. For description of course see 1c.

c) Analytical Geometry. This course includes plane and solid analytical geometry and the more important higher plane curves. It aims to show the association of algebra with geometric representation. The calculus method of finding the slope of a conic section is given in addition to the direct geometric method. Simple applications to mechanics and physics are given.

Required of freshmen in the B. S. and B. E. courses. Five hours weekly throughout the year.

3. Analytical Geometry. For description of course see 2c.

Optional for sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

4. Differential and Integral Calculus. This course includes drill in differentiation and integration; the application of derivatives to curves; maxima and minima; the development of series; problems involving rates, curvature, surfaces and volumes; and the application of calculus to problems in mechanics and physics.

Required of sophomores in the B. S. course and elective for juniors in the A. B. and Ph. B. courses who have had course 3. Three hours weekly throughout the year.

4a. Differential and Integral Calculus. This course includes all of 4 and also additional work which is essential for engineering students.

Required of sophomores in the B. E. courses. Five hours weekly during the first semester and three hours weekly during the second semester.

5. Differential Equations. The greater part of this course is given to the treatment of ordinary differential equations and their applications to geometry, electricity, physics and mechanics. A review of the calculus, especially methods of integration, is required.

Required of juniors in the E. E. course and elective for juniors in the B. S. course and seniors in the A. B. and Ph. B. courses who have had course 4. Three hours weekly throughout the year.

6. Advanced Calculus. This course continues the study of partial differential equations with applications. The other subjects treated will be changed from year to year.

Elective for seniors in the B. S. and E. E. courses who have had course 5. Three hours weekly throughout the year.

7. Review and Advanced Mathematics. This course gives a review of the algebra, trigonometry, analytical geometry, calculus and analytical mechanics, required of civil and sanitary engineers during the first three years, showing the logical connection of the several subjects and their application to engineering problems. In connection with this review frequent tests are given. The course also includes some work in advanced calculus.

Required of seniors in the G. E. course. Three hours weekly during the second semester.

8. Honor Course. Candidates will be given advanced work in various subjects suited to their special ability.

Open to seniors who have complied with the requirements for special honors. Three hours weekly throughout the year.

Mechanics and Physics

PROFESSOR OPDYKE AND ASSISTANT PROFESSOR KLEEMAN

For students in the A. B., Ph. B. and B. S. courses, the work in mechanics and physics is elective, during the junior and senior years.

For students in the B. E. course, the work in mechanics and physics is required throughout the sophomore year. This is followed by the study of applied mechanics in the engineering department; and a B. E. student, in case his schedule of hours allows it, may elect physics during his junior and senior years, upon special vote of the faculty.

The collection of apparatus for the illustration of lectures is extensive. It has been secured largely from foreign makers and includes sets of standard pattern by Koenig, Duboscq, Ruhmkorff, and others. For laboratory work, the supply of apparatus is being enlarged, with the purpose of teaching by the laboratory method chiefly.

The courses in detail are as follows:

1. **General Physics.** This course is intended to give a general presentation of the facts and laws of physics, and the aim is to make the student thoroughly familiar with the chief phenomena of the subject and their explanation. The work begins with the study of mechanics, including statics and kinetics and the elementary properties of matter, and continues through sound, heat, light, magnetism and electricity. Particular emphasis is placed upon laboratory work. Physical laws are taught through direct experiment performed by the student himself; the lectures direct his study. In mechanics, special emphasis is laid upon the solution of problems and upon such analytical treatment as shall give preparation for the applied mechanics of the engineering department; and throughout the whole course the student is encouraged to do individual work and reading.

Required of sophomores in the B. E. course. Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses who have had mathematics 2c or 3. Two laboratory periods and two lectures weekly throughout the year.

2. Experimental Physics. The purpose of this course is to continue and to broaden physics 1. It consists of individual work in the laboratory supplemented by lectures and discussions. Instruments of precision are used and skill in accurate work is developed.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have taken physics 1; open to juniors and seniors in the B. E. course upon special vote of the faculty. Two laboratory periods and one lecture period weekly throughout the year.

1a. General Physics M. This course is similar to but less extensive than physics 1. It requires no mathematics beyond that required for admission to the B. S. course and is intended for students in the one year course offered by the college in preparation for admission to the medical department of the university.

Required in the pre-medical course. Two laboratory periods and two lectures weekly throughout the year.

3. Mathematical Physics. This course is open to those who have taken physics 1 and mathematics 5, and aims to carry out and complete the mathematical discussion of some parts of the subject. A discussion of some of the simpler facts and problems of Astronomy is included. A good knowledge of calculus is required, and an elementary knowledge of differential equations. Some time is devoted to a further study of differential equations as applied to physical problems, and through lectures and assignments of reading the student is introduced to more advanced work.

Elective for seniors in the A. B., Ph. B. and B. S. courses who have taken Physics 1; open to juniors and seniors in the B. E. course upon special vote of the faculty. Three hours weekly throughout the year.

4. The Electron Theory. This course treats of the nature and properties of ions in gases, solids and liquids; the electronic constants; radio-active changes; the propagation of α , β and γ rays; the ionisation of matter by various ionising agents; and the electron theory of matter.

Opportunity for research is provided.

Open to graduate students; elective for seniors in the A. B., Ph. B. and B. S. courses who have had physics 1 and are taking physics 3. Open to juniors and seniors in the B. E. course upon special vote of the faculty. One hour weekly throughout the year.

5. Honor Course. Candidates must complete all the regular work of the department and must pursue, in addition, a special course in advanced mechanics and physics three hours a week throughout the senior year, and must submit theses.

Open to seniors who have complied with the requirements for special honors.

Chemistry

PROFESSOR ELLERY, MR. SALATHE, AND MR. CARLE

The object of instruction in this department is to develop power of accurate observation and logical reasoning, and habits of careful work. Students who are planning special courses in chemistry, medicine, biology, geology, or other branches of natural science, will find the courses of great value. The laboratory facilities are convenient, the apparatus and chemicals are the best, and the chemical library contains recent books on various branches of the science.

1. General Chemistry. The course includes an exhaustive study of the non-metals and their compounds, together with the fundamental laws and theories of chemistry, a special study of the common metals, and a brief introduction to organic chemistry. Laboratory practice in the fall and winter terms is strictly quantitative, and in the spring term includes simpler methods of qualitative analysis involving the recognition of single metals and acid radicals in solution.

Required of sophomores in the B. E. courses. Two recitations and one laboratory period weekly throughout the year.

1a. General Chemistry. This course is similar to course 1, in that it includes the study of metals and non-metals, theories and laws, but analytical work in the laboratory is limited to recognition of acid radicals in solution.

Required of freshmen in the B. S. course. Elective for juniors and seniors in the A. B. and Ph. B. courses. Two recitations and one laboratory period weekly throughout the year.

1b. General Chemistry. This course differs from courses 1 and 1a in that two laboratory periods weekly are required throughout the year.

Required of students in the one-year pre-medical course. Two recitations and two laboratory periods throughout the year.

1c. Advanced Inorganic Chemistry. The work of this course includes a review of the fundamental laws and theories of the science and of the properties and the methods of preparation of the common non-metals and metals. This is followed by the theory and study of solutions, dissociation, ionization, the relation of various forms of energy to chemical change, chemical equilibrium, the periodic system and Moseley's atomic numbers, crystal structure, radio-activity, and the electronic hypothesis of matter.

Required of freshmen in the B. S. course in Chemistry. Three hours weekly throughout the first semester.

This course will be offered first in the first semester of the college year 1917-18.

2. Chemistry of Engineering Materials. This course covers a more exhaustive study of the metals than course 1, and acquaints the student with some of the applications of chemistry to engineering problems. The laboratory work comprises systematic chemical and physical examination of complex mixtures, particularly of those materials which are of especial interest to engineers.

Required of juniors in the B. E. course, option A. Two recitations and two laboratory periods during the first semester.

2a. Qualitative Analysis. A study of the reactions of bases and acids in solution, a course in blowpipe analysis, a systematic examination of complex solutions of metals and acids, and of complex solids.

Optional for sophomores in the B. S. course. Elective for juniors in the B. S. course who had biology in their sophomore year and for seniors in the A. B. and Ph. B. courses, who have

had course 1a. Three laboratory periods weekly throughout the year.

2b. Qualitative Analysis. On the experimental side this course is intended to train the student in habits of careful and exact manipulation, while developing a facility in the rapid analysis of inorganic substances. The student is required to prepare matter for analysis, and to analyze complicated mixtures.

On the theoretical side the following topics are studied: Ionization and its relation to conductivity, osmotic pressure and chemical activity; chemical equilibrium and the law of mass action; the colloidal condition; solubility product.

Required of freshmen in the B. S. course in Chemistry, second semester, and of sophomores in the B. S. course in Chemistry, first semester. Four hours weekly during the second semester of freshman year, and three hours weekly during the first semester of sophomore year.

This course will be offered first in the second semester of the college year 1917-18, and the first semester of the college year 1918-19.

3. Quantitative Analysis. In this course the student becomes familiar with various gravimetric and volumetric methods of analysis.

Elective for juniors and seniors in the B. S. course who have had course 2a. Three laboratory periods weekly throughout the year.

Students who elect quantitative analysis will be expected to elect course 1, general physics.

3a. Technical Analysis. This course comprises the more important commercial and municipal methods of chemical analysis. The work includes the study of various metallurgical processes, analyses of iron and steel, gas, water, cements, milk, foods, etc., and is calculated to give preparation for educational, industrial and municipal positions.

Elective for juniors and seniors in the B. S. course who have had or are pursuing course 3, and who have maintained a grade of at least 80 in courses 1a and 2a. Three laboratory periods weekly throughout the year.

3b. Quantitative Analysis. The object of this course is to carry into the actual operations of exact measurements of weights and volumes the habits of carefulness and accuracy formed in course 2b. The work begins with a careful calibration of weights and determination of the sensibility of the analytical balance. This is followed by the study of the preparation of pure salts by re-crystalization, by precipitation, by change of solvent, and by double decomposition. Typical quantitative methods are then studied as follows:

Determination of metals as oxid, as sulfate and sulfid, as phosphate, as chromate, and as chlorid; determination of the acids of the halogens, sulfur, and nitrogen; determination of carbonic, boric, and phosphoric acids.

Following the study of these typical methods, the student is required to make a quantitative analysis of some alloys and minerals. The study of electrolytic apparatus and manipulation is then taken up and the electrolytic determination of some metals completes the gravimetric portion of the course.

The part of the course devoted to volumetric analysis includes the usual methods of acidimetry, oxidation and reduction, iodometry, and precipitation. Practical application of volumetric methods is made in analysis of iron, copper, and manganese ores, and of commercial substances such as bleaching powder, bisulfites, and certain alloys and soils.

Required of sophomores in the B. S. course in Chemistry. Five hours weekly during the second semester.

This course will be offered first in the second semester of the college year 1918-19.

4. Organic Chemistry. This course comprises analysis of organic compounds, the preparation of typical organic substances, and a thorough study of the principles and theories of organic chemistry

In addition to the analysis of organic compounds, students in this course will have opportunity to make molecular weight determinations by the vapor density method, and the boiling and freezing point method. They will also have opportunity to study the effects of electrolysis on typical organic compounds.

Elective for seniors in the B. S. course who have had course 3. Three laboratory periods weekly throughout the year.

Students who elect organic chemistry are expected to elect course 1, general biology, if they have not already pursued that course in their junior year.

4a. Organic Preparations. This course is supplementary to course 4, and includes the study of organic compounds which have industrial uses, or whose preparation presents special difficulties or exceptions to usual methods. Among other topics considered are the mixed ethers and the esters, and their use as artificial flavoring and perfume, saponification as applied to soaps, dyestuffs, amino-compounds and nitrogen products generally, with especial reference to the proteids and alkaloids.

Elective for seniors in the B. S. course who have had courses 3 and 3a, who are pursuing course 4, and who have maintained a grade of at least 80 in courses 3 and 3a.

4b. Organic Chemistry. This course begins with a study of the saturated hydrocarbons, their isomerism and preparation and properties. This is followed by a study of the derivatives of the paraffines in this order:

The halogen substitution products, the alcohols, the ethers, the aldehydes, the ketones, the fatty acids, esters, the amines, amids, and the carbohydrates.

The work on the paraffines is followed by a study of the olefines and their derivatives, and the hydrocarbons of the acetylene series. Familiarity with these classes of organic compounds is essential to a clear understanding of the phenomenon of stereo-isomerism, which is taken up at this point.

The second part of the theoretical instruction in this course is given to the study of the aromatic compounds in the following order:

Benzene and its homologues; the halogen derivatives; nitro-salts; amino-compounds; the diazo-salts; the sulphonic acids and derivatives; phenols and derivatives; naphthalene and its compounds; anthracene and its compounds; pyridine and quini-dine; the vegetable alkaloids; uric acid and allied compounds; terpenes; dyes and their manufacturing processes.

The requirements of the course in experimental work include

a study of the preparation of typical organic compounds of both the paraffine and aromatic groups. Emphasis is laid not only on the production of a pure organic compound, but also upon the efficiency of the method of preparation. The students are required to secure the highest possible yield in every reaction, and urged to study improvements of methods with a view to increasing the yield.

Required of juniors in the B. S. course in Chemistry. Six hours weekly during the first semester, and five hours weekly during the first part of the second semester.

This course will be offered first in the first semester of the college year 1919-20.

5. Sanitary Chemistry. In the first semester the course includes a limited study of gravimetric and volumetric methods in quantitative analysis. In two other semesters the course covers water analysis, both chemical and bacteriological; analysis of sewage and the effluent of sewage disposal plants; and analysis of the products of garbage disposal plants. Lectures are given during the year on public health methods of the larger cities of the United States.

Required of juniors and seniors in the G. E. course, Option C. Four hours weekly throughout the junior year and during the second semester of the senior year.

6. Physical Chemistry. On the theoretical side, this course includes a review of the atomic theory, the gas laws, and the periodic law as treated in the course 1c, of the theory of ionization and its allied phenomena as treated in the course 2b, and takes up in addition the kinetic theory and Van der Waals' equation, molecular complexity, relation of physical properties to composition and constitution, rate of chemical transformation and thermo-chemical change, and certain considerations connected with salt hydrolysis and neutralization of acids and bases.

In the laboratory the students make molecular weight determinations, and conductivity measurements, determine boiling point and vapor pressure curves of liquid mixtures, and make practical determination of osmotic pressure. In addition some or all of the following experiments are performed:

Setting up of thermostat; preparation of standard barium hydroxid solution; calibration of apparatus and study of errors; viscosity of water and benzene; specific gravity; surface tension of benzene; distribution coefficient; refractive index; specific rotation of cane sugar; partition coefficients; heat of neutralization; transport numbers; velocity of reaction; and electromotive force measurements.

Required of juniors in the B. S. course in Chemistry. Five hours weekly during the second semester.

This course will be offered first in the second semester of the college year 1919-20.

7. Special Analyses. This course is largely given to laboratory practice. It takes up the methods of collecting and confining gases for analyses, the study of absorbents for various gases, methods of analyzing illuminating gas, and of gases which are absorbed by water, and of determining the water vapor content of gas mixtures.

The second part of the course gives especial attention to the sanitary analysis of water, and includes chemical, biological, and microscopical methods.

The third part of the course is given to the analysis of food materials, and detection of adulterations. The food materials studied are milk, butter, cereals, flour, fermented liquors, and flavoring extracts.

Required of seniors in the B. S. course in Chemistry. Six hours weekly during the first semester.

This course will be offered first in the first semester of the college year 1920-21.

8. Assaying and Industrial Chemistry. This is also largely a laboratory course. Typical methods of assaying gold, silver, lead, and copper ores are first studied. Methods of manufacturing certain important commercial products are carried out on a small scale. The list of products includes muriatic, sulfuric, and nitric acids; lime, cement, and plaster; soaps; oils and resins; paints; fertilizers; chlorin and related products; soda; starch and sugar; bleaching and laundering; explosives; petroleum; the textiles; and pulp and paper.

Required of seniors in the B. S. course in Chemistry. Six hours weekly during the second semester.

This course will be offered first in the second semester of the college year 1920-21.

9. **Honor Course.** Students who have done satisfactory work in courses 1a and 2a are eligible for honors in the department. In addition to the six credit hours of work offered in the junior and senior years, candidates for honors are required to take a course in physical chemistry, read assigned works on general and industrial chemistry, work out some original problem in inorganic or organic chemistry and present a thesis on the work and pass an oral examination covering the work of the four years in chemistry.

Biology and Geology

PROFESSOR STOLLER AND ASSISTANT PROFESSOR MAVOR

1. **General Biology.** In this course, after an introductory study of cells and tissues, a series of types of plants and animals is studied with reference to structure, function and development. It is intended to make the work a discipline in the method of scientific study and to afford the student a knowledge of the broader facts and principles of biological science in their general philosophical values. Laboratory work, lectures and recitations, counting as a three-hour course.

Alternate with chemistry for sophomores in the B. S. course. Three hours weekly throughout the year.

2. **Biology and Geology.** This course is intended to afford a general knowledge of these sciences as branches of liberal culture. The treatment is general and philosophical rather than technical but some laboratory work is required and constant use is made of illustrative material. The course includes a consideration of the scientific evidences of organic evolution and the theories of evolution of various authors.

Alternate with mathematics for sophomores in the A. B. and Ph. B. courses. Three hours weekly throughout the year.

3. **Pre-Medical Biology.**

a) **Elementary.** This course has been arranged to meet the

requirement of the medical department of Union University, see page 30. It comprises a laboratory study of the anatomy, histology, and embryology of a series of types of animals, and lectures and recitations on animal classification, parasitology, genetics and organic evolution.

Required of freshmen in the one-year pre-medical course. Four hours weekly throughout the year.

b) Advanced. This course is of a more advanced character than the preceding and requires as a preparation either course 1 or course 2 above.

Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses. Four hours laboratory and two hours lectures throughout the year.

4. Mineralogy and Geology. This course consists largely of laboratory and field work. It begins with the determination in the laboratory of common minerals and rocks. Physiographic and structural geology are studied on the basis of the topographic maps and folios of the United States survey and of the New York state geological survey. Along with the practical work a text-book course in general geology is given.

Elective for juniors and seniors in the A. B., Ph. B. and B. S. courses. Three hours weekly throughout the year.

5. Economic Geology (a). In this course after an introductory study in the laboratory of common minerals and rocks the work is related to the occurrence and distribution in the United States of building stones and materials, mineral ores, coal and other economic products and to the study of geological structure in relation to engineering problems.

Required of juniors in the G. E. course. Two hours weekly during the first semester.

6. Geology.

a) Economic Geology (b). Laboratory work on minerals and mineral products of economic importance; study of geologic maps and bulletins dealing with distribution and occurrence of economic products; text-book study. (First semester).

b) Structural and Historical Geology. Readings and discussions of geological reports, especially of New York State geology;

field work in the identification of geological formations; collection and determination of fossils. (Second semester).

Elective for seniors in the A. B., Ph. B., and B. S. courses. Three hours weekly throughout the year.

7. **Honor Course, Field Geology.** A study of the geological features of the region of country surrounding Schenectady including the Helderberg and Saratoga localities from the standpoint of structural and historical geology. At least 120 hours of field work is required and a detailed report on an assigned area. Three hour course.

Open to seniors who have complied with the requirements for special honors and have had course 5 and are taking course 6.

Physiology and Physical Training

DR. MCCOMBER

Physical training and the study of human anatomy, physiology, and hygiene are required in all courses. The work consists of recitations and lectures, demonstrated by means of the microscope, the manikin and the human skeleton. An attempt is made to give a practical course covering the essential facts of the subject with the idea of arousing in every student a genuine self interest, of developing a wholesome self respect without overwhelming him with the mass of details that must be considered in a close study of anatomy.

The course in hygiene is designed to acquaint the student with practical laws concerning the preservation of health and to impress upon his mind the dependence of health upon the consistent observance of such laws. Lectures on first aid to the injured, bacteriology, contagious and infectious diseases and social purity form a part of the course.

It is the aim of the department to give the student such a training in the methods of physical education that he may have a comprehensive knowledge of the subject, and to secure health, vigor and such harmonious development of the body as will fit it to resist disease, and prepare it for efficient service, both now and later in life.

Work in the gymnasium is required of freshmen only, but the organization of voluntary classes makes it possible for all to secure the advantages of systematic exercise. The course in the gymnasium is so arranged as to give a knowledge of the different kinds of apparatus pertaining to physical training. Commencing with light work, consisting of free gymnastics, club, dumb-bell and wand exercises, the course leads through a graded series, involving heavier work as the student becomes fitted for it.

Swimming is a regular part of the course in gymnastics and all freshmen are expected to acquire a reasonable proficiency in it. Life saving under the auspices of the American Red Cross is taught.

Freshmen are required to pass an examination in gymnastics, credit being based upon actual proficiency in the various exercises as indicated by such examination. During the spring and fall students may elect field sports.

A physical examination of new students is made at the beginning of the year and corrective exercises are prescribed for the remedy of physical defects. Charts of the physical measurements showing the comparison of the individual with the normal development and hand books containing much valuable hygienic data are furnished upon payment of a small fee. All candidates for college teams are required to pass a satisfactory physical examination before they are allowed to compete in athletic contests.

It is the policy of the department to influence the entire student body to take an active part in athletic sports and gymnastics and not to cater to the exceptional athlete to the exclusion of those who are physically less perfectly equipped.

1. Physiology and Hygiene.

Required of freshmen in the A. B., Ph. B., B. S., and B. E. courses. Two periods weekly throughout the year.

2. Physical Training.

Required of all freshmen. Two periods weekly throughout the year.

Special Lectures

It is the policy of the college to provide its students with the advantages of frequent lectures by specialists in the various departments of knowledge.

In endowing the Ichabod Spencer Professorship in Philosophy, Mrs. Katherine Spencer Leavitt set aside the sum of \$25,000 to establish a lectureship in memory of her father, the Reverend Ichabod Spencer, D. D., of the class of 1822, to be known as the Ichabod Spencer Lectureship in Psychology.

These lectures are given by distinguished scholars in this department, each year's course being published in book form.

Library

The library occupies Nott Memorial Hall. It contains forty thousand volumes, and includes the engineering and scientific library of the late Professor Gillespie, the collection of mathematical works made by the late John Patterson, of Albany; the library of the late Hon. Henry J. Cullen, of the class of 1860, and the library of ancient and classical languages and literatures of the late Professor Tayler Lewis. The income from a bequest of five thousand dollars left by the late Lemon Thomson, Esq., of Albany, of the class of 1850, is devoted to the purchase of books on American subjects, especially history and political science. An alcove, known as the Thomson Alcove, is reserved for these books. By the will of the late Rev. Oscar Blakeslee Hitchcock, of the class of 1852, a bequest of upwards of thirty thousand dollars was left to the college for the purchase of books, manuscripts, etc. A most important accession is the Croes Engineering Library, the gift of Mr. Edgar Beach Van Winkle of the class of 1860. This section of the library is in the General Engineering Building for the use of the engineering department of the college. The library is classified according to the Dewey decimal system and a dictionary card catalogue, on the Dewey plan, is now being prepared.

One hundred and fifteen periodicals and the transactions of many learned societies are received.

Library Rules

Hours: 8-1; 2-6; 7:30-9 from Monday to Friday. 8-1; 7:30-9 on Saturday.

The library will be closed on Sundays and legal holidays.

The library will be open during vacation at hours to be announced.

Loan of books: Reference, Cullen and valuable books are not to be loaned.

Reserved books may be loaned over night, i. e., from 9 p. m. to 8 a. m. There will be a fine of \$1.00 per day or part of a day for each reserved book overdue.

Periodicals are regarded as reference books.

All other books may be loaned, not more than two at a time, for a period of two weeks, and may be once renewed, unless called for. A fine of ten cents per day will be charged for all books overdue, and all library privileges will be withdrawn until the book is returned and the fine paid.

The Natural History Museum

PROFESSOR STOLLER, CURATOR

The Wheatley collection of minerals, presented to the college in 1858, by E. C. Delavan, Esq., contains 4,000 specimens, many of which represent the more valuable forms. This collection has recently been carefully inspected by Dr. D. S. Martin of New York city. All of the specimens have been re-identified and the entire collection has been re-arranged and placed in order for exhibition and for study.

In geology there is a general collection of rocks and minerals, and a considerable collection of the paleozoic rocks and fossils of the New York formations.

In zoology the collection of mounted birds numbers 311 specimens, representing 161 species of the bird fauna of the eastern United States. These have recently been carefully inspected, and re-labelled. Fishes, amphibia and reptiles, especially of the local fauna, are represented by specimens in alcohol. In the department of invertebrates the collections of marine animals made by

Dr. Harrison E. Webster are extensive, including sponges, corals, worms, crustacea and mollusks, the total number of species represented being over 5,000. The Wheatley collection of shells, presented by E. C. Delavan, Esq., consists of 8,000 specimens.

The botanical collections include a nearly complete set of local flowering plants, the work of Professor Jonathan Pearson. To this there has since been added a complete set of the ferns and fern allies of Schenectady county. The herbarium also includes a considerable number of foreign plants, including representative collections from Germany, Spain, Asia Minor and England, as well as some specimens from Iceland, Norway, France and Switzerland. They have been sorted and distributed in a single series following the latest accepted sequence, that of Engler and Prantl's *Natürliche Pflanzenfamilien*, making the entire collection of some 8,000 or 10,000 specimens readily accessible for reference and study.

The museum is open to the public on Wednesday afternoon and Saturday morning. Visitors may be admitted at other times by making application to the college librarian.

The Literary Societies

The Philomathean Society, founded in 1793, about two years prior to the founding of the college, and the Adelpic Society, founded in 1796, invite to membership all students specially interested in debating. The societies hold frequent meetings during the autumn and winter months for the discussion of current, social and political questions. A joint debate is held in December in competition for the Allison-Foote prizes, page 143.

Religious Life

Religious life among the students is cared for through the agency of the Union College Christian Association. This work is under the special care of a secretary who devotes his time to the religious interests of the students. Vesper services are held every Sunday afternoon throughout the year and eminent speakers are secured to conduct these services.

CURRICULA OF ACADEMIC COURSES

The numeral after a subject refers to the course as described in the departmental statement; the number in parenthesis refers to the page where the statement is given. The hours show the time given the subject each week in the class room.

Course A leading to Degree of A.B.

The full entrance requirement in Greek is required for admission to this course.

Freshman Year

First Semester

Greek 1, and English.....	(45)	5 hours
Latin 1.....	(47)	4 hours
French 1	(53)	3 hours
Mathematics 1	(66)	4 hours
Physiology and Hygiene 1.....	(79)	2 hours

Total 18 hours

Second Semester

Studies of first semester continued

One credit hour throughout the year is required in Gymnastics

Sophomore Year

First Semester

Greek 2 and History.....	(46)	4 hours
Latin 2.....	(48)	3 hours
English 3.....	(56)	3 hours
German 2.....	(51)	5 hours
Mathematics 3.....	(66)	3 hours

or

Biology and Geology 2.....	(77)	3 hours
Rhetoric 10.....	(57)	1 hour

Total 19 hours

Second Semester

Studies of first semester continued

Junior Year

First Semester

Rhetoric 11.....	(58)	1 hour
Electives.....	(94)	15 hours

Total 16 hours

Second Semester

Studies of first semester continued

Senior Year*First Semester*

Rhetoric 12	(58)	1 hour
Electives	(95)	15 hours

Total 16 hours

Second Semester

Studies of first semester continued

Course B leading to Degree of A.B.

No Greek is required for admission to this course

Freshman Year*First Semester*

Greek 1a and English	(45)	5 hours
Latin 1	(47)	4 hours
German 1a	(50)	3 hours
or		
French 1a	(53)	3 hours
Mathematics 1	(66)	4 hours
Physiology and Hygiene 1	(79)	2 hours

Total 18 hours

Second Semester

Studies of first semester continued

One credit hour throughout the year is required in Gymnastics

Sophomore Year*First Semester*

Greek 2a and History	(46)	4 hours
Latin 2	(48)	3 hours
English 3	(56)	3 hours
French 2	(54)	5 hours
or		
German 2	(51)	5 hours
Mathematics 3	(66)	3 hours
or		
Biology and Geology 2	(77)	3 hours
Rhetoric 10	(57)	1 hour

Total 19 hours

Second Semester

Studies of first semester continued

Junior Year*First Semester*

Rhetoric 11	(58)	1 hour
Electives	(94)	15 hours

Total 16 hours

Second Semester

Studies of first semester continued

Senior Year*First Semester*

Rhetoric 12	(58)	1 hour
Electives	(95)	15 hours

Total 16 hours

Second Semester

Studies of first semester continued

Course leading to Degree of Ph.B.**Freshman Year***First Semester*

Latin 1	(47)	4 hours
German 1b	(50)	5 hours
or		
French 1b	(53)	5 hours
English 1	(55)	3 hours
Mathematics 1	(66)	4 hours
Physiology and Hygiene 1	(79)	2 hours

Total 18 hours

Second Semester

Studies of first semester continued

One credit hour throughout the year is required in Gymnastics

Sophomore Year*First Semester*

Latin 2	(48)	3 hours
French 2	(54)	5 hours
or		
German 2	(51)	5 hours
English 3	(56)	3 hours
History 1	(59)	4 hours
Mathematics 3	(66)	3 hours
or		
Biology and Geology 2	(77)	3 hours
Rhetoric 10	(57)	1 hour

Total 19 hours

Second Semester

Studies of first semester continued

Junior Year*First Semester*

Rhetoric 11	(58)	1 hour
Electives	(94)	15 hours
		Total 16 hours

Second Semester

Studies of first semester continued

Senior Year*First Semester*

Rhetoric 12	(58)	1 hour
Electives	(95)	15 hours
		Total 16 hours

Second Semester

Studies of first semester continued

Course leading to Degree of B.S.**Freshman Year***First Semester*

German 1b	(50)	5 hours
or		
French 1b	(53)	5 hours
English 1	(55)	3 hours
Mathematics 2	(66)	5 hours
Chemistry 1a	(70)	3 hours
Physiology and Hygiene 1	(79)	2 hours
		Total 18 hours

Second Semester

Studies of first semester continued

One credit hour throughout the year is required in Gymnastics

Students who offer Latin for entrance take Latin 1 in place of German 1b or French 1b.

Sophomore Year*First Semester*

French 2	(54)	5 hours
or		
German 2	(51)	5 hours
English 3	(56)	3 hours
History 1	(59)	4 hours

Mathematics 4	(66)	3 hours
Chemistry 2a.....	(71)	3 hours
or		
Biology 1.....	(77)	3 hours
Rhetoric 10.....	(57)	1 hour
		<hr/>
Total		19 hours

Second Semester

Studies of first semester continued

Junior Year*First Semester*

Rhetoric 11.....	(58)	1 hour
Electives.....	(94)	15 hours
		<hr/>
Total		16 hours

Second Semester

Studies of first semester continued

Senior Year*First Semester*

Rhetoric 12.....	(58)	1 hour
Electives.....	(95)	15 hours
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Total		16 hours

Second Semester

Studies of first semester continued

Course leading to Degree of B. S. in Chemistry**Freshman Year***First Semester*

Mathematics 2.....	(66)	5 hours
Drawing GE1.....	(101)	3 hours
Hygiene 1.....	(80)	2 hours
English 1.....	(55)	2 hours
German 1b.....	(50)	5 hours
or		
French 1b.....	(53)	5 hours
Chemistry 1c.....	(71)	3 hours
		<hr/>
Total		20 hours

Second Semester

Mathematics 2.....	(66)	5 hours
Drawing GE1.....	(101)	2 hours
Hygiene 1.....	(80)	2 hours
English 1.....	(55)	2 hours
German 1b.....	(50)	5 hours
or		
French 1b.....	(53)	5 hours
Chemistry 2b.....	(72)	4 hours

 Total 20 hours

One credit hour throughout the year is required in Gymnastics

Sophomore Year*First Semester*

Physics 1.....	(68)	4 hours
Mathematics 4a.....	(67)	5 hours
German 2.....	(51)	5 hours
or		
French 2.....	(54)	5 hours
History 1.....	(59)	3 hours
Chemistry 2b.....	(72)	3 hours

 Total 20 hours
Second Semester

Physics 1.....	(68)	4 hours
Mathematics 4a.....	(67)	3 hours
German 2.....	(51)	5 hours
or		
French 2.....	(54)	5 hours
History 1.....	(59)	3 hours
Chemistry 3b.....	(73)	5 hours

 Total 20 hours
Junior Year*First Semester*

Mechanics ME1.....	(117)	4 hours
Electrical Engineering Theory EE1.....	(118)	3 hours
Electrical Engineering Laboratory EE21.....	(119)	1 hour
Biology 1.....	(77)	3 hours
Mathematics 5.....	(67)	3 hours
Chemistry 4b.....	(74)	6 hours

 Total 20 hours

Second Semester

Mechanics ME2	(118)	5 hours
Electrical Engineering Theory EE2	(118)	3 hours
Electrical Engineering Laboratory EE22	(119)	1 hour
Biology 1	(77)	3 hours
Mathematics 5	(67)	3 hours
Chemistry 4b and 6	(74,75)	5 hours

Total 20 hours

Senior Year*First Semester*

Electrical Engineering Theory EE3	(118)	3 hours
Electrical Engineering Laboratory EE23	(119)	1 hour
Economics 1	(64)	3 hours
Mathematics 6	(67)	3 hours
or		
Geology 3b	(78)	3 hours
Chemistry 7	(76)	6 hours
Electron Theory, Physics 4	(69)	1 hour
Research		2 hours

Total 19 hours

Second Semester

Electrical Engineering Theory EE4	(119)	3 hours
Electrical Engineering Laboratory EE24	(120)	1 hour
Economics 1	(64)	3 hours
Mathematics 6	(67)	3 hours
or		
Geology 3b	(78)	3 hours
Chemistry 8	(76)	6 hours
Electron Theory, Physics 4	(69)	1 hour
Research		2 hours

Total 19 hours

Pre-Medical Course*First Semester*

Physics 1a	(69)	4 hours
Biology 3a	(77)	4 hours
Chemistry 1b	(71)	4 hours
German I or 1a	(49,50)	3 hours
English 1	(55)	3 hours

Total 18 hours

Second Semester

Studies of first semester continued

One credit hour throughout the year is required in Gymnastics

SCHEDULE OF REQUIRED STUDIES IN THE ACADEMIC COURSES

A. B. Course, A

Freshman Year

Greek, 5 hours.....	M., T., W., Th., S., 9-10
Latin, 4 hours.....	M., W., F., S., 11-12
French, 3 hours.....	T., Th., S., 10-11
Mathematics, 4 hours.....	M., T., Th., F., 1:30-2:30
Physiology and Hygiene, 2 hours.....	W., F., 8-9

Sophomore Year

Greek and History, 4 hours.....	M., T., Th., S., 10-11
Latin, 3 hours.....	T., Th., S., 9-10
English, 3 hours.....	M., W., F., 8-9
German or French, 5 hours.....	T., W., Th., F., S., 11-12
Mathematics, 3 hours.....	M., W., F., 1:30-2:30
or	
Biology and Geology, 3 hours.....	W., F., 1:30-2:30; lab M., 1:30-3:30
Rhetoric, 1 hour.....	T., 1:30-2:30 or 2:30-3:30

Junior Year

Rhetoric, 1 hour.....	S., 10-11
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Senior Year

Rhetoric, 1 hour.....	F., 3:30-4:30
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A. B. Course, B

Freshman Year

Greek, 5 hours.....	M., T., W., Th., S., 9-10
Latin, 4 hours.....	M., W., F., S., 11-12
German, 3 hours.....	M., W., F., 10-11
or	
French, 3 hours.....	T., Th., S., 10-11
Mathematics, 4 hours.....	M., T., Th., F., 1:30-2:30
Physiology and Hygiene, 2 hours.....	W., F., 8-9

Sophomore Year

Greek and History, 4 hours.....	M., T., Th., S., 10-11
Latin, 3 hours.....	T., Th., S., 9-10
English, 3 hours.....	M., W., F., 8-9
German or French, 5 hours.....	T., W., Th., F., S., 11-12

Mathematics, 3 hours.....M., W., F., 1:30-2:30
 or
 Biology and Geology, 3 hours.W., F., 1:30-2:30; lab M., 1:30-3:30
 Rhetoric, 1 hour.....T., 1:30-2:30 or 2:30-3:30

Junior Year

Rhetoric, 1 hour.....S., 10-11

Senior Year

To be scheduled in 1917-18.

Ph. B. Course

Freshman Year

Latin, 4 hours.....M., W., F., S., 11-12
 German or French, 5 hours.....M., T., W., F., S., 9-10
 English, 3 hours.....T., Th., S., 8-9
 Mathematics, 4 hours.....M., T., Th., F., 1:30-2:30
 Physiology and Hygiene, 2 hours.....W., F., 8-9

Sophomore Year

Latin, 3 hours.....T., Th., S., 9-10
 German or French, 5 hours.....T., W., Th., F., S., 11-12
 English, 3 hours.....M., W., F., 8-9
 History, 3 hours.....T., Th., S., or M., W., F., 10-11
 Mathematics, 3 hours.....M., W., F., 1:30-2:30
 or
 Biology and Geology, 3 hours.W., F., 1:30-2:30; lab M., 1:30-3:30
 Rhetoric, 1 hour.....T., 1:30-2:30 or 2:30-3:30

Junior Year

Rhetoric, 1 hour.....S., 10-11

Senior Year

Rhetoric, 1 hour.....F., 3:30-4:30

B. S. Course

Freshman Year

German or French, 5 hours.....M., T., W., F., S., 9-10
 or
 Latin, 4 hours.....M., W., F., S., 11-12
 English, 3 hours.....T., Th., S., 8-9
 Mathematics, 5 hours.....M., W., Th., F., S., 10-11
 Chemistry, 3 hours...T., Th., 11-12; lab T., Th., or F., 1:30-3:30
 Physiology and Hygiene.....W., F., 8-9

Sophomore Year

German or French, 5 hours.....T., W., Th., F., S., 11-12

English, 3 hours.....M., W., F., 8-9

History, 3 hours.....T, Th, S, 10-11 or M., W., F., 10-11

Mathematics, 3 hours.....M., W., F., 9-10 or T., Th., S., 9-10

Chemistry, 3 hours.....M., W., 1:30-4:30
or

Or

Biology, 3 hours.....M., W., 1:30-2:30; lab Th., or F., 1:30-3:30

Rhetoric, I hour.....T., 1:30-2:30 or 2:30-3:30

Junior Year

Rhetoric, 1 hour.....S., 10-II

Senior Year

Rhetoric, 1 hour.....F., 3:30-4:30

Pre-Medical Course

Physics 1a, 4 hours.....T., Th., 10-11; lab M., W., 1:30-3:30 or
3:30-5:30

Biology 4, 4 hours..W., F., 9-10; lab M., F., 10-12 or W., S., 10-12

Chemistry 1b, 4 hours.....T., Th., II-12; lab T., 1:30-5:30

German, 3 hours.....M., W., F., 8-9

English, 3 hours.....T., Th., S., 8-9

SCHEDULE OF JUNIOR AND SENIOR ELECTIVES

A total of fifteen hours is required.

Each junior is required to choose two electives to be continued for two years, one of which must be the continuation of a subject previously pursued in college.

Each senior is required to continue, in addition to the elective named in his junior year for continuation, one other junior elective.

The head of a department may direct the choice of electives in other departments, for honor students, to the number of six hours in each year.

Subjects that conflict have been placed in the same group.

Junior Groups

Group I

The Bible, 3 hours.....	M., W., F., 8-9
French 3, 3 hours.....	M., W., F., 8-9
French 3a, 3 hours.....	M., W., F., 8-9
Greek B, 3 hours.....	M., W., F., 8-9
American History, 3 hours.....	M., W., F., 8-9
Mineralogy and Geology, 3 hours.....	M., W., F., 8-10

Group II

Latin, 3 hours.....	M., W., F., 9-10
English History, 3 hours.....	M., W., F., 9-10
Mineralogy and Geology, 3 hours.....	M., W., F., 8-10
Argumentation, 3 hours.....	M., W., F., 9-10

Group III

Economics I, 3 hours.....	M., W., F., 10-11
Differential Equations, 3 hours.....	M., W., F., 10-11
Biology 4, 4 hours.....	T., S., 9-10; lab., M., F., 10-12

Group IV

European History, 3 hours.....	M., W., F., 11-12
Biology 4, 4 hours.....	T., S., 9-10; lab., M., F., 10-12

Group V

German 3, 3 hours.....	T., Th., S., 8-9
German 3a, 3 hours.....	T., Th., S., 8-9
Greek A, 3 hours.....	T., Th., S., 8-9
Advanced Biology.....	T., Th., S., 8-10

Group VI

English 4, 3 hours.....	T., Th., S., 9-10
Calculus, 3 hours.....	T., Th., S., 9-10
Advanced Biology.....	T., Th., S., 8-10

Group VII

Physics 1, 4 hours.....	T., Th., 10-11; lab M., W., 1:30-3:30 or 3:30-5:30
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Group VIII

Logic, Psychology and Ethics, 3 hours.....	T., Th., S., 11-12
General Chemistry, 3 hours.....	T., Th., 11-12; lab F., 1:30-3:30

Group IX

Spanish, 3 hours.....	M., W., F., 1:30-2:30
Qualitative Analysis, 3 hours.....	M., W., 1:30-4:30
Physics 1, 4 hours.....	T., Th., 10-11; lab M., W., 1:30-3:30 or 3:30-5:30
General Chemistry, 3 hours....	T., Th., 11-12; lab F., 1:30-3:30

Group X

Quantitative Analysis, 3 hours.....	T., Th., 1:30-4:30
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Senior Groups**Group I**

The Bible, 3 hours.....	M., W., F., 8-9
German, 3 hours.....	M., W., F., 8-9
American History, 3 hours.....	M., W., F., 8-9
Mineralogy and Geology, 3 hours.....	M., W., F., 8-10
Electron Theory 4, 1 hour.....	F., 8-9

Group II

English History, 3 hours.....	M., W., F., 9-10
Economics 3, 3 hours.....	M., W., F., 9-10
Advanced Calculus, 3 hours.....	M., W., F., 9-10
Mineralogy and Geology, 3 hours.....	M., W., F., 8-10
English 8, 3 hours.....	M., W., F., 9-10

Group III

Latin 4, 3 hours.....	M., W., F., 10-11
English 7, 3 hours.....	M., W., F., 10-11
Differential Equations, 3 hours.....	M., W., F., 10-11
Biology 4, 4 hours.....	Th., S., 9-10; lab., M. F., 10-12

Group IV

History of Philosophy, 3 hours.....	M., W., F., 11-12
European History 3, 3 hours.....	M., W., F., 11-12
Biology 4, 4 hours.....	Th., S., 9-10; lab., M. F., 10-12

DEPARTMENTS OF INSTRUCTION

TECHNICAL

General Engineering

- OLIN H. LANDRETH, A. M., C. E., Sc. D.
 Professor of Civil Engineering
- ALLEN B. MCDANIEL, S. B.
 Assistant Professor of Civil Engineering
- WARREN C. TAYLOR, S. B.
 Assistant Professor of Civil Engineering
- JOHN A. C. CALLAN, M. C. E., A. M.
 Assistant Professor of Surveying and Drawing
- MORTIMER F. SAYRE, E. M., A. M.
 Instructor in Engineering

Electrical Engineering

- ERNST J. BERG, M. E., Sc. D.
 Professor of Electrical Engineering
- CHARLES P. STEINMETZ, A. M., Ph. D.
 Professor of Electro Physics
- WALTER L. UPSON, M. E., M. S., M. E. E.
 Associate Professor of Electrical Engineering
- MORLAND KING, M. E. E.
 Assistant Professor of Electrical Engineering
- JOHN N. VEDDER, A. M.
 Assistant Professor of Thermodynamics
- WALLACE BRYANT KIRKE, Ph. B., M. S.
 Instructor in Electrical Engineering

Historical. Before the beginning of technical education at Union College unusual attention was given to instruction in science. The first full professorship in natural science in an American college was founded at Union and it is a matter of special scientific interest that Prof. F. R. Hassler was called from this chair in 1811 to establish the United States Coast Survey.

The civil engineering department of Union College was one of the oldest technical schools in the country. Founded in 1845 with Prof. William M. Gillespie at its head, it at once took high rank, and for many years was one of the few engineering schools

in America. From the first it was the evident policy of the department to adapt the thorough training of L'Ecole des Ponts et Chaussées, of Paris, France, where Prof. Gillespie had finished his technical education, to the demands of professional practice in a vigorous new country, where resources and opportunities were abundant, and where capital and professional precedent were wanting. From the characteristic tendencies impressed on the department at its foundation it has never departed, although it has endeavored to keep pace with the development in American technical education and with the increased demands on professional training. For many years civil engineering only was taught; then, as the principles of modern sanitary science came to be better understood and the possibilities of their further development and their utilization as life-saving agencies were discerned, a course in sanitary engineering was established; and more recently a course in electrical engineering was added.

From the beginning the teaching of engineering at Union College has been directed to broad, fundamental training rather than to narrow specialization and during recent years, since its advanced entrance requirements have made room in the course, increased time and attention have been given to culture studies and to a larger proportion of academic training.

Local Advantages. Schenectady is a peculiarly favorable location for an engineering school. The city is on the Mohawk River, and is intersected by several steam railroads, a number of inter-urban trolley lines and the Erie Canal, furnishing many bridges and other engineering works. At Schenectady are also located the works of the General Electric Company and of the American Locomotive Company, each an extensive and leading industry in its respective line. Among other interesting engineering features may be mentioned the city grade-crossings improvement completed at a cost of a million dollars, and the city water-works, which contain in their outfit a system of ground-water wells and a set of electrically-driven multiple-stage centrifugal pumps, of twenty million gallons daily capacity. The neighboring cities of Albany, Troy and Cohoes, as well as the surrounding territory, offers numerous examples of good engineering

and many features of value as aids in engineering training. Among these may be mentioned the scientific departments of the state government at Albany, comprising the state engineer's department, which includes the new barge canal division, the good roads division and the bureau for testing materials; the headquarters of the state water supply commission, which includes also the state river improvement work; the headquarters of the Public Service Commission for district No. 2; the state library, which is well supplied with technical and engineering works; the Albany city water filtration plant; at Troy, the Burden iron works and the Gurley engineering instrument manufactory; at Watervliet, the United States arsenal and gun factory; the water power developments and electric power transmission plants at Mechanicville, Spier Falls, Schaghticoke and Johnsonville; the hydraulic cement works at Glens Falls and at Howe's Cave; and the modern sewage disposal systems at Saratoga Springs, Ballston Spa and Scotia. The new barge canal will pass the Cohoes falls by a flight of locks and will pass Schenectady by a system of locks and dams, both permanent and movable, now under construction, which will canalize the Mohawk River, calling for extensive and interesting engineering operations. All these sources of aid are utilized in the work of instruction.

Courses of Study

Undergraduate Courses. Two undergraduate courses of study in engineering are offered, each extending through four years.

1) A course in general engineering, intended to give the basis of a broad engineering education, including the fundamental principles underlying special branches of the profession, and offering three options: (a) Option A, which is devoted to the more purely technical civil engineering subjects; (b) Option B, which affords training along executive and administrative lines; and (c) Option C, which lays special emphasis on sanitary engineering subjects.

2) A course in electrical engineering in which the last two years are devoted to essentially mechanical and electrical engineering subjects.

These two courses are identical during the first two years. The degree of Bachelor of Engineering is given for the successful completion of either course.

Graduate Courses. In addition to the above undergraduate courses in engineering, the following graduate courses and degrees are offered:

The degrees of Master of Civil Engineering (M. C. E.) and of Master of Science in Electrical Engineering (M. S. in E. E.) are given on the satisfactory completion of one-year graduate courses of resident study in civil engineering and in electrical engineering, respectively. The degree of Doctor of Philosophy (Ph. D.) is given to candidates who have received the master's degree, on the completion of an additional course of two years of graduate study in electrical science. See page 147.

The non-resident degree of Civil Engineer (C. E.) and Electrical Engineer (E. E.) may be conferred upon graduates of Union College under conditions explained on page 148.

Studies of the Two Undergraduate Courses

Especially in the first two years many of the studies of the engineering course are the same as those given in the academic courses. These are described under the departmental statements on pages 45-80. There follows an outline of the technical studies which are common to the four-year courses given in general and electrical engineering. The studies which are peculiar to each are outlined in the statement of the separate departments.

Studies required in the first two years of the other courses are:

Mathematics	Page 66
Physics	Page 68
Chemistry	Page 70
English	Page 55
Modern Languages	Page 49
Hygiene	Page 79

Any of the other studies of the academic courses of the college may be taken by engineering students without extra charge, on approval of the faculty.

The following technical subjects are included in each of the

two engineering courses and the instruction is given by the general engineering department.

G.E.1. Engineering Drawing. This course commences with freehand drawing, which includes the subject of form, proportion and perspective; light and shade; the aesthetics of decorative and applied design; drawing from models and thorough practice in lettering. The last part of the term is devoted to mechanical drawing, including the study of the care and use of instruments, mechanical lettering, shading, patent office drawing, and isometric and oblique projections.

Required of all engineering freshmen. One lecture and two drawing periods weekly during the first semester.

A good set of drawing instruments and other necessary drafting equipment are required for the mechanical drawing.

G.E.1a. Engineering Drawing. This course continues the work in mechanical drawing commenced of the first semester. Study is made of mechanical, civil and architectural engineering drafting room conventions, rendering in color orthographic projection of solids in the 4 quadrants, machine sketching, the development of working drawings, and blue printing.

Required of all engineering freshmen. One lecture and one drawing period weekly during the second semester.

G.E.2. Descriptive Geometry. This course presupposes G.E.1 and G.E.2. Original problems relating to the stationary and revolved positions of points, lines, and planes are given in addition to the study of the first seventeen problems of Church's Descriptive Geometry. A study is also made of problems relating to tangent planes; the intersections and developments of plane, curved and warped surfaces; shades and shadows; and linear perspective. Use is made of the Schroeder models, the Olivier models, and the models of the Paris Polytechnical School. The application of the subject to practical problems is emphasized.

Required of all engineering sophomores. One lecture, one recitation and one drawing period weekly during the second semester.

G.E.3. Surveying. This course starts with mensuration of lines, surfaces, and solids, including the principles involved in direct and indirect measurements. This is in preparation for the

major part of the course, which is a careful study of the elementary principles of surveying. Precision and error are made an important feature in connection with the use, manipulation, and adjustment of the engineer's transit, level, and chain. Field and plotting work accompany class room study.

Required of all engineering freshmen. One recitation and one field or drawing period weekly during the second semester.

G.E.4. Plane Surveying. This course is a continuation of G.E.3 and consists of a study of the methods of plane surveying. Various methods of traversing, running profiles, and engineering surveying are studied. Computations include problems involving latitudes and departures, coordinates, areas, omitted measurements, error of closure, parting off land, earth work and boundaries.

Field work and plotting is conducted along practical lines to illustrate the application of these principles.

Required of all engineering sophomores. One recitation and one field or drawing period weekly during the first semester.

G.E.30 and 31. Engineering Lectures. Lectures are given on topics pertaining to the training and qualifications of an engineer and to the engineering profession. Students are assigned parallel readings bearing on these topics.

Required, G.E.30, of all engineering freshmen, one hour weekly during the first semester; G.E.31, of all engineering sophomores, one hour weekly during the second semester.

G.E.32. Summer Vacation Work. All students in the engineering courses during their summer vacation following the freshman, sophomore and junior years are required to prepare a report on their summer work. This report must be done under one of the following options:

- a) Actual participation in engineering work.
- b) Investigation by research and reading.
- c) Critical examination of some engineering project.
- d) Critical reading and abstract of a stated amount from an approved list of books. The details of these options are announced by the department.

The work is due at the opening of the first semester.

G.E.33. Commencement Term Work. In addition to the weekly field and laboratory exercises throughout the year, all freshman and sophomore engineering students, and juniors in the general engineering course, are given an uninterrupted fifteen days' course in field-practice and laboratory work supplementary to the studies in which such practice is desirable. The course begins on the day (Thursday) following Commencement and continues through that and the two following weeks. The work is so selected and arranged as not only to supplement the studies of the year, but also to give instruction and practice in the organization, operation and direction of work conducted by engineering parties. This work receives three hours' credit in the first semester grades.

General Engineering Department

Three Optional Courses. In the four-year general engineering courses three optional courses are offered, any one of which may be selected by general engineering students at the beginning of the junior year, and each of which extends through the junior and senior years.

The first of these courses, designated as Option A, offers a broad, fundamental, general engineering training such as a thoroughly trained engineer should have before specializing in any of the branches of the profession.

The second course, designated as Option B, while in the main identical with the former, differs from it by omitting some of the more technical subjects, such as sewerage, geodesy and railroad construction, and by substituting therefor, municipal government and international law, the principles of finance and financial operations, the principles of business management and accounting, and additional work in history and in engineering law and procedure. The object of this course is to offer to engineering students an opportunity to qualify themselves for engineering positions of an executive or administrative character.

The third course, designated as option C, offers work in sanitary engineering subjects. While in the main it follows Option A, it includes sanitation, sanitary analysis, heating and ventilation,

and additional work in chemistry, in substitution for some of the more technical civil engineering subjects of Option A.

List of Studies

The studies given by the general engineering department during the third and fourth years are described below in detail. The subjects taught during the first two years are given on the preceding pages.

Studies given by other departments during the third and fourth years are:

Rhetoric	Page 57
History	Page 59
Chemistry	Page 70
Economic Geology	Page 78
Economics	Page 64
International Law	Page 60
Municipal Government	Page 65
Sanitary Analysis	Page 75
Mathematics	Page 66

The engineering subjects not previously described are:

G.E.5. Topographical Surveying. The principal subjects considered in this course are the principles of stadia measurements and their applications, methods of locating contours, city surveying, underground surveying, United States land surveying and hydrographic surveying.

Field and office practice in these subjects accompany the classroom periods.

Required of all general engineering juniors. One recitation and one field period weekly during the first semester.

G.E.6. Route Surveying and Highways.

a) Route Surveying. This course is devoted to the elements of reconnaissance and location including in detail, railroad curves, simple, compound, and reversed; switches and frogs, turnouts; easements; and earthwork. Field problems and office computations accompany the recitation work.

b) Highways. This includes a study of economic location; the details of the various types and methods of highway construction;

the materials and the maintenance of highways. Street location and maintenance, paving methods, and paving materials with special reference to their sanitary aspects are also considered.

Required of general engineering juniors. Four hours weekly during the second semester.

G.E.8. Geodesy. Under this head is given a course which virtually includes four subjects. The work starts with a short study of spherical trigonometry, which prepares for work in descriptive and mathematical astronomy. This latter topic affords the student a general knowledge of astronomy. The fundamental principles of the method of least squares and their application to the solution of astronomical, physical and engineering problems are next considered. The general subject of geodesy is then taken up, including the principles of adjustment of error, and their use in establishing empirical formulas; a discussion of the figure of the earth; triangulation; base lines; and precise leveling. The work is accompanied by field periods and includes triangulation methods and precise leveling, together with the determination of time, latitude, azimuth and longitude.

Required of general engineering juniors, Option A. Four hours weekly during the second semester.

G.E.9. Applied Mechanics. This course comprises a study of the principles of kinematics; the dynamics of particles and rigid bodies, including the dynamics of rotation, friction and lubrication; and the general principles and applications of statics.

Required of general engineering juniors. Four hours weekly during the first semester.

G.E.10. Mechanics of Materials. This comprises a study in the strength of materials including stresses and strains of all kinds of bodies subjected to various loadings. The course also takes up the production, preparation and physical properties of engineering materials. In conjunction with this work is a laboratory exercise which comprises tests of the physical properties of brick, wood, steel, iron, stone, and concrete, and also work in the cement laboratory in the preparation and properties of cement, mortar and concrete.

Required of all engineering juniors. Three recitation hours and one laboratory period weekly during the second semester.

G.E.11. Engineering Stresses. This course consists in the application of the principle of mechanics to the determination of the stresses in the various forms of bridges and roof trusses.

Required of general engineering seniors. Five hours weekly during the first semester.

G.E.12. Engineering Design.

An important feature of these courses is the work in articulate structures, foundations, masonry construction, and water-power and other hydraulic development. The exercises in this line of work are, as far as possible, chosen from professional practice, and the student is expected to carry out, from assigned data and conditions, the preliminary study, determinations of stresses, types, dimensions and details, and to turn in the results in the form of working drawings, diagrams and memoirs. The course is preceded by a series of lectures on the principles and economics of designing. The department possess a large collection of drawings and photographs of representative engineering structures from which students can form correct ideas of modern practice in the designing of details and in the methods followed on works of this class. The courses are also supplemented by actual design in the drafting room, including a steel mill building and a plate girder bridge.

Required of general engineering seniors. Five hours weekly during the second semester.

G.E.13. Thermodynamics. This course consist of lecture, recitation and exercise work in the principles of thermodynamics, including the thermal properties of gases and vapors, saturated and superheated steam, the steam indicator and the steam engine.

Required of general engineering juniors. Two hours weekly during the second semester.

G.E.14. Hydraulics. This course covers the principles of hydrostatic and hydrodynamic pressure, flow of water over weirs, through orifices, through pipes and open channels. The work in the class room is supplemented by laboratory exercises.

Required of all general engineering juniors. Two recitation and one laboratory period weekly during the first semester.

G.E.15. Electrical Machines. A course in the fundamental principles and use of electrical generators, motors, transformers, transmission and other electrical machines. This course is given by the electrical engineering department.

Required of all general engineering juniors. Two hours weekly during the second semester.

G.E.16. Water and Sewage. This includes a study of rainfall, run-off, and storage of water, in relation to both water power and potable supplies. The work in sewerage considers the design and construction of sewage systems, disposal plants with the underlying principles involved.

Required of general engineering seniors in Options A and C. Five hours weekly during the second semester.

G.E.17. Railroad Construction. In this course a complete investigation is made of the economic location and construction of railroads, railroad equipment, train resistance, maintenance of way, and buildings and yards. Field and drawing periods accompany the class room work.

Required of general engineering seniors in Option A. Two recitation and one field or drawing period weekly during the first semester.

G.E.18. Motors and Motive Power. Following the work in thermodynamics and hydraulics of the junior year an outline course in motors and motive power is given in the first semester of the senior year, comprising a study of the sources of demand and supply of power, steam-boilers, steam-engines, steam turbines, water-wheels and turbines, gas-engines, electric motors and transmission of power by shafting, belting, rope-driving, compressed air and electricity. The new laboratory affords opportunity for efficiency tests of hydraulic and other forms of motors.

Required of general engineering seniors. Four hours weekly during the first semester of senior year.

G.E.19. History of Architecture. This course is a study of the development of architecture from the earliest times to the present

from the standpoint of first, the revelation of history, and second, the evolution of form, style, type and the orders.

Required of general engineering seniors. One hour weekly during the first semester.

G.E.20. Building Construction. This course comprises a study of the construction of buildings including the discussion of the various materials and their preparation; the classes and methods of framing, in steel, wood and concrete; and a short study of the principles of reinforced concrete as applied to building construction.

Required of all general engineering seniors. Three hours weekly during the second semester.

G.E.21. Heating and Ventilation. Sanitation.

a) Heating and Ventilation. Under this topic are considered both direct and indirect systems of heating and ventilation in use today, including steam, hot water, hot air, plenum, natural draft, and district heating. Practical problems involving these principles are an important part of the work.

b) Sanitation. The fundamental principles of sanitation and public health are discussed in this course, including such topics as contagion, epidemics, sanitary food supplies, sanitary inspection and disinfection.

These two subjects are conducted consecutively under one course.

Required of general engineering students in Option C. Three hours weekly during the first semester.

G.E.23. Sanitary Analysis. This is a laboratory course given by the department of chemistry in the analyses of air, gases, water and sewage.

Required of general engineering seniors in Option C. Three periods weekly during the second semester.

G.E.24. Engineering Law. This course includes a treatment of the fundamental development of law from the Roman and English common law, the function of the state in general, and the American system of federal and state jurisdiction in particular. Some attention is given to the fundamental bases of the

law of contracts, agency, property rights and corporations; and to the principles of finance and financial operations.

Required of general engineering seniors in Options A and C. Three hours weekly throughout the year.

G.E.25. Engineering Law. This course includes a treatment of the fundamental development of law, the function of the state in general and the American system of federal and state jurisdiction in particular. Attention is given to the fundamental bases of laws, contracts, agency, property rights, and corporation and municipal laws. The subjects are treated more extensively than in Option A, G.E.24.

Required of general engineering juniors in Option B. Three hours weekly during the first semester and two hours weekly during the second semester.

Principles of Finance, Business, Accounting. General engineering students who elect Option B are given instruction in the principles of finance and financial operations, the principles of business and industrial organization and administration, and the principles of accounting and of cost-keeping. The following courses are offered.

G.E.26. Principles of Finance.

Required of general engineering seniors in Option B. Three hours weekly during the first semester.

G.E.27. Principles of Administration.

Required of general engineering seniors in Option B. Two hours weekly during the second semester.

G.E.34. Thesis. Each candidate for graduation is required to present on or before the third Wednesday in May of his graduation year a satisfactory thesis on a subject that has been approved by the professors of civil engineering or of electrical engineering. This thesis must be original in its character and may be either a design for some engineering structure or plant, process or operation, or an independent investigation of some principle, problem or matter of engineering importance. Reviews or copies of existing structures, plants or processes, unless of special educational value or involving original investiga-

tion, will not be approved as subjects. The thesis is to be in a form prescribed at the time of approval of the subject, and is to be bound for deposit in the library of the engineering department, and must be presented in this shape on or before the stipulated date. The subjects, with outlines of the proposed treatment, must be submitted in time for final approval not later than October 15th preceding graduation, and the work on the theses must be presented for inspection and criticism of the professor in charge of the department at intervals during progress.

Equipment

General Engineering Building. The new engineering building, the donation of Mr. Andrew Carnegie for the general engineering department, erected at a cost of \$100,000, is a handsome structure of modern design, built of gray and buff pressed brick with gray stone trimmings.

The building is of fireproof construction throughout, the only wood used being in the doors, windows, and floor surface. It covers an area of 67 x 137 ft. and is three stories in height, with a basement above the ground level, making it practically four stories.

The entire east end of the basement, 50 by 62 feet in area, is used as a hydraulic and mechanical laboratory. Water for the hydraulic laboratory is supplied by a six-inch centrifugal pump, capacity 2000 gallons per minute, pumping water into a steel tank 5 feet in diameter and 52 feet high, extending to the roof. The base of this tank is provided with connections for standard orifices of various sizes and shapes. Other apparatus include an eight-inch Venturi meter; a 15-inch exhibition Pelton motor, with glass sides, connected to a Prony brake for testing; pressure, differential gages, and draft gages of various types, with gage testing apparatus; small displacement water meters; scales and tanks for weighing and measuring water; hook gages, current meter, and rod floats.

A second tank, seven feet long, with stilling bay, gives opportunity for measurement of fountain flow, for tests of orifices of various types under small heads, and of small weirs, the water discharged being either measured or weighed. Water from this

tank and from the Pelton motor returns to a concrete canal in the floor, 5 feet deep, 9 feet wide, and 20 feet long; passes over a standard weir, 30 inches wide, and thence goes to the centrifugal pump intake. This canal is later to be extended to a total length of 100 feet, and equipped with additional temporary dams and weirs. A small copper tank gives opportunity for demonstrations of shapes of jets from orifices of various shapes, and of certain laws governing flow of water through pipes. For measurement of flow of water in pipes and in open channels, there is a standard Pitometer, with differential gage and all connections, loaned last spring by Mr. A. S. Cole, president of the Pitometer Co.

A Riehle testing machine, recently installed, makes possible the testing of all kinds of structural materials in tension, compression, and transverse strength, up to a load of 200,000 pounds. Gifts from the American Locomotive Co. include a good collection of vernier and micrometer calipers, pressure gages, steam engine indicators, tachometers, revolution counter, a complete set of Johanssen gages, and other apparatus.

The first floor contains five recitation rooms and two offices. In the southeast corner is an engineering library and reading room. Here is placed the Croes library recently donated by E. B. Van Winkle of the class of 1860, the more recent engineering books from the main library, and also the collection of engineering drawings belonging to the department. This room is open for the use of students as a general reference and reading room every afternoon except Saturday.

In the southwest corner of the basement is the cement laboratory, 46 x 26 ft. in area, equipped for the testing of cement, concrete, and similar structural materials. This includes a Fairbanks briquette testing machine and also a new Riehle Testing Machine for tension, compression and transverse strength of cement and mortar up to 5000 pounds. The northwest corner of the basement is taken up by a room for surveying instruments, with lockers, etc., for issuing equipment to field parties.

On the second floor the north half is taken up by two large lecture or society rooms, each of which can be divided by folding partitions into two recitation rooms of the usual size. The

south half of this floor is taken up by a computing room and building construction museum and one large and one small recitation room.

On the third floor are two large drawing rooms, each about 24 x 60 ft., two smaller drawing rooms and a class room. All of these rooms are well lighted by windows and skylights. On this floor is also a good-sized blue-print room, a photographic room, and a dark room.

Each floor contains two or more small private offices for the use of instructors; and the entire plan of the building is admirably adapted to the needs of the department.

Instruments and Apparatus. The department is supplied with field instruments of the best description, comprising a large theodolite, suitable for refined geodetic operations, transits, surveyors' compasses, prismatic compasses, Burnier's compass, solar compass, Y levels, plane tables, sextants, and a marine chronometer.

The extensive private collection of models and instruments belonging to the late Professor Gillespie was purchased for the engineering school.

The collection of models in descriptive geometry and stereotomy is very complete. The following are some of the most important:

The Olivier Collection. This consists of about fifty models, representing the most important and complicated ruled surfaces of descriptive geometry, particularly warped or twisted surfaces. Their directrices are represented by brass bars, straight or curved, to which are attached silk threads representing the elements or successive positions of the generatrices of the surfaces. Each of these threads has a weight suspended by it, so as always to make it a straight line. These weights are contained in boxes sustaining the directrices and their standards. The bars are movable in various directions, carrying with them the threads, still stretched straight by the weights in every position they may take; so that the forms and natures of the surface which they constitute are continually changing, while they always remain

ruled surfaces. In this way a plane is transformed into a paraboloid, a cylinder into a hyperboloid, etc.

These models were invented by the late Theodore Olivier while professor of descriptive geometry at the Conservatoire des Arts et Métiers, in Paris. One set of them is now deposited there, and a second is in the Conservatory at Madrid. Copies of some of them are to be found in most of the polytechnic schools of Germany. The Union College set is the original collection of the inventor, having been made in part by his own hands, and, after his death, in 1853, retained by his widow till bought of her by Professor Gillespie in 1855. It is more complete than that in the Paris Conservatoire. It may be worth noticing that the silver plates on the boxes, reading "*Inventé par Théodore Olivier*," etc., were added by Madame Olivier, at her own expense, after the purchase, as a tribute to the memory of her husband, her own words being, "*Je tenais à ce que chaque instrument portât le nom du savant dont la réputation passera à la postérité.*"

Bardin's Models (Paris), in plaster, (seventy), of the intersections of prisms, pyramids, cones, etc.

Schroeder's Models (Darmstadt) of elementary descriptive geometry (twenty). The planes of projection are in wood, and the lines and surfaces in metal; models illustrating shades and shadows.

Stone Cutting Models (twenty), in plaster, selected from those of L'Ecole Polytechnique of Paris; Professor Bardin's models (ten) in plaster, of oblique arches; groined and cloistered arch models (ten) in wood and plaster; models of structures in stone, consisting of bridges, culverts, etc.; winding-stair models in wood and plaster.

Models in Topography. French and German plaster models, giving all the different forms of ground, accompanied by topographical drawings, showing how to represent these forms by contour lines; hatchings and shades from vertical and oblique light; models and maps in colored topography; a large model of Mount Cenis pass, showing the wagon road and contour lines.

Architectural Models. Models of the five orders of architecture

from L'Ecole des Beaux Arts, Paris; portals; stairs; roofs; walls; buttresses; domes, etc.

Engineering Models. Schroeder's models of joints, brick bonds, etc.; spur wheels; bevel wheels; cranes; pile drivers; various forms of water-wheels; pumps; cylinders; valves; eccentrics; etc.; steam engines.

Casts of St. Venant's models showing the changes of form in bodies subjected to flexure. Full sized model of the liquid vein measured by Poncelet and Lesbros.

Models of bridges of various systems, comprising truss, suspension, tubular and arch bridges; models of fortifications, illustrating Vauban's system; shot, shell, etc.; models of culverts, piers, abutments, culvert heads, wing walls, rail sections, etc.

Maps, Drawings, Etc. This collection embraces a large number of maps, plates, profiles, topographical drawings and spherical projections; engravings, lithographs, photographs and detail drawings of engineering and architectural structures; working drawings of machines, bridges, buildings, etc.

Physical Apparatus. To illustrate the lectures in physics, the college has an extensive collection of apparatus. This has been secured largely from foreign makers and includes special pieces of apparatus constructed under the direction of the late Professor Foster, besides sets of apparatus of standard patterns by Koenig, Duboscq, Ruhmkorff, and others.

In Mineralogy. The Wheatley collection contains nearly 4,000 specimens of minerals, the result of the labors of Charles M. Wheatley. All of these have been labeled according to the nomenclature and order adopted by Dana. They are without exception, open at all times to the students. They furnish an admirable means of practical illustration in mineralogy. Among the rare and valuable specimens are those of anglesite, cerusite, mimetite and calcuprite, which in American specimens are equaled only by those in the British Museum. There are many fine specimens representing the noble metals from all parts of the world. There are few known species of minerals of which the collection does not contain some specimens.

In addition to this there is a large series of unlabeled specimens for crystallographic and blow-pipe examination.

In Metallurgy. The college possesses a suite of ores of the useful metals, comprising over 1,000 specimens. These have been arranged to illustrate their mode of occurrence and geographical distribution. In addition are the fluxes, fuels, etc., used in obtaining the metals from the ores, together with the slags and metals themselves in various forms. There is a large number of models and drawings of stacks, furnaces, etc.: also suites of specimens of wood, charcoal, mineral coal, peat, etc., for physical inspection; also specimens of most of the useful alloys.

In Chemistry. The chemical laboratory is furnished with tile-top desks and lockers, and all the modern apparatus necessary for work in general chemistry and qualitative and quantitative analysis. Ample hoods occupy one side of the laboratory, where the student may work with the disagreeable and poisonous gases. In the private laboratory of the professor of chemistry provision is made for any students who may desire to pursue advanced courses, either in volumetric analysis, water and milk analysis, organic chemistry, or any special work in connection with courses of other departments.

A large number of specimens of the materials used in the manufacture of the mineral and some of the organic acids; the crude products themselves and the materials used in the manufacture of the alkalis, soaps, matches, black lead, candles, petroleum products; linseed, olive, castor, cottonseed and other oils; paper, porcelain, glass, fire and building brick, mortar and cements, beet and cane sugar, white lead and other paints, etc., etc., form a part of the permanent collection of the department.

Electrical Engineering Department

Purpose and Methods. A course of instruction in electrical engineering was introduced in 1895, and in 1902 was re-organized and made into a separate department of the engineering school under the direction of Professor Charles P. Steinmetz, consulting engineer of the General Electric Company. In 1913 Dr. Stein-

metz resigned as head of the department to become Professor of Electro-Physics, and Dr. Ernst J. Berg was appointed Professor of Electrical Engineering in charge of the department.

The course of studies offered by the department of electrical engineering aims at a thorough and broad scientific education of the prospective engineer, rather than the specific training of a specialist. The instruction, therefore, consists of three classes of studies. The general culture studies furnish such training as is now considered essential for every educated man, as languages, literature, history, etc. Such instruction extends over a large part of the first two years, and is then followed by a broad and general technical education, giving the student the fundamental principles and their application to all branches of engineering. Ultimately follows the specific instruction in electrical engineering, which, while it enables the student, after graduation, to enter the field of electrical engineering practice in the manufacturing or operating company or consulting engineer's office in a subordinate capacity only, has given him all the necessary requirements to gather in a few years' practice the knowledge needed for independent work of greater magnitude.

The instruction especially aims at a thorough understanding of the fundamental principles rather than a memorizing of numerous facts — that is, aims at quality, and not quantity — and as far as possible in all engineering instruction the subject is brought before the student in three different ways; by a theoretical lecture course with recitations, practical instruction in the electrical laboratory paralleling the lecture course, and, following this, the application of the knowledge gained in lecture courses and laboratory to calculation and design. Finally, more independent work on the solution of engineering problems is undertaken by the students. Throughout the technical course, by work in the laboratory, some familiarity with the apparatus is given to the students before the technical side is taken up in the lecture course, so that when approaching the theoretical studies of electrical phenomena or apparatus the student is already to appreciate the practical value and importance of the subject with which the theoretical investigations deal.

Through the active interest which the General Electric Company takes in technical education, an arrangement has been effected between the college authorities and the officials of the company by which the students in the junior and senior classes are admitted to the company's works at appointed times, under the direction of their instructor, with the privilege and opportunity of studying and inspecting the plant and operations and of being regularly instructed therein.

List of Studies

In the following list of studies, only those subjects of the electrical engineering course which are not required in the other courses are described in detail. All the culture studies and most of the general engineering and scientific studies are pursued in common with the students of other engineering branches. Beginning with the junior year, however, the courses diverge. The electrical engineers take up a number of mechanical engineering subjects and continue them throughout the junior and first part of the senior year.

Studies also required in other courses are:

American History	Page 59
Rhetoric	Page 57
Economics	Page 64

In addition to the required studies one of the following subjects was open as an elective in the senior year, 1916-17:

Advanced Calculus	Page 67
Qualitative Analysis	Page 71
International Law	Page 60
Electron Theory	Page 69
English	Page 55
Argumentation	Page 58
German	Page 49
English History	Page 60

This list may be changed from year to year.

M.E.1. Advanced Mechanics. This course takes up the principles of mechanics from the engineering point of view. The

principles of elementary mechanics are extended to three dimensions. The topics treated include: statics, dynamics of a particle, rigid dynamics, moments of inertia, work, energy, friction, etc.

Required of electrical engineering juniors. Four hours weekly during the first semester.

M.E.2. Advanced Mechanics. This course includes structures, strengths of material, and hydraulics.

Required of electrical engineering juniors. Five hours weekly during the second semester.

M.E.3. Thermodynamics. In this course the fundamental principles of thermodynamics are developed along with the mathematics necessary. The mechanical properties of perfect gases are treated, together with gas engine cycles, air-refrigeration, etc.

Required of electrical engineering seniors. Three hours weekly during the first semester.

M.E.4. Thermodynamics. The fundamental principles of thermodynamics are applied to saturated and superheated steam, ammonia, and other vapors. The principles of the reciprocating, steam turbine and gas engine are developed, and in this connection special study is made of the flow of fluids.

Required of electrical engineering seniors. Three hours weekly during the second semester.

E.E.1. Elements of Electricity, Magnetism, and Theory of Direct Current Machines. The prerequisites are physics and mathematics.

Required of electrical engineering juniors. Three hours weekly during the first semester.

E.E.2. Principles of Alternating Currents. This course includes the representation of alternating current waves and a review of the theory of complex numbers. The prerequisite course is E.E.1.

Required of electrical engineering juniors. Three hours weekly during the second semester.

E.E.3. Theory of Alternating Current Machines. This course deals with the transformer and the alternator. The prerequisite course is E.E.2.

Required of electrical engineering seniors. Three hours weekly during the first semester.

E.E.4. Theory of Alternating Current Machines. Continued. This course deals with the synchronous motor, induction motor, rotary converter, alternating current commutator motors, and simple transient phenomena. Problems of illumination and power plant economics. The prerequisite course is E.E.3.

Required of electrical engineering seniors. Three hours weekly during the second semester.

E.E.13. Seminar. This is a course intended to bring the student in touch with phases of electrical engineering which do not enter entirely into the work of the other courses. It includes lectures by members of the department, the presentation and discussion of papers by the students themselves, and local trips of inspection to the works of the General Electric Company.

Required of electrical engineering seniors. One hour weekly during the first semester.

E.E.14. Seminar. This is a continuation of E.E.13 during the second semester.

E.E.21. Junior Electrical Laboratory. This is a course in laboratory work in which studies and measurements of elementary circuits are carried on. It deals also with more advanced direct current measurements and the tests of direct current generators and motors.

Required of electrical engineering juniors. Four hours weekly during the first semester.

E.E.22. Junior Electrical Laboratory. This is a course in laboratory work dealing with more advanced direct current measurements and the study of elementary alternating current circuits.

Required of electrical engineering juniors. Three hours weekly during the second semester.

E.E.23. Senior Electrical Laboratory. This is a course in laboratory work dealing with alternating current circuits and apparatus, especially the transformer and alternator.

Required of electrical engineering seniors. Four hours weekly during the first semester.

E.E.24. Senior Electrical Laboratory. This is a course in laboratory work dealing largely with synchronous and induction motors and the synchronous converter.

Required of electrical engineering seniors. Four hours weekly during the second semester.

E.E.34. Electrical Machine Design. This is a course in the designing of electrical apparatus, particularly the transformer, generator, and the induction motor.

Required of electrical engineering seniors. Three hours weekly during the second semester.

Literary Essay. A literary essay on a subject determined by the department of English is prescribed during the first semester of the junior and senior years.

Special Lectures. During the year a few lectures on highly specialized subjects are given by prominent engineers. These lectures are open to juniors, seniors and graduates, and are optional.

To juniors, seniors and graduate students of the course is available the notable privilege of becoming, upon payment of a nominal fee, members of the Schenectady Section of the American Institute of Electrical Engineers. Throughout the winter occur, before this society, a succession of lectures probably without an equal except before the national body itself.

Inspection Trips. It is desirable that each student in the electrical engineering courses participate during his college life in extended trips of inspection of engineering activities. Such trips are, therefore, arranged at a low cost to each man and vary from year to year. It is the policy of the department to continue to arrange such trips and to conduct them when sufficiently representative groups of men can attend.

Electrical Laboratory Equipment

The electrical engineering laboratory is a commodious, well-lighted building, and permits the arrangement and grouping of the machines in a flexible relation to each other.

The ground plan of the building is T-shaped. The upper bar of the T is two stories. The lower floor is devoted to the main laboratory, which is 101 ft. by 35 ft. outside dimensions.

Two large recitation rooms and offices occupy the major portion of the second floor. In the rear two wireless stations are erected, one being used exclusively by the "Wireless Club" and the other being used for research work largely done by graduate students.

The purpose of a college laboratory of electrical engineering is two-fold: To familiarize the student with the shape, appearance, relative proportions and construction of modern electrical apparatus, and to instruct him in the handling, assembling, testing and operation of electrical apparatus under normal and abnormal conditions.

Because of the great variety and large size of modern electrical apparatus, the former purpose can be fulfilled very incompletely only, even in the largest and best equipped college laboratories. Through the favorable disposition of the General Electric Company, by giving the electrical engineering students of Union College free access to the works and testing rooms, this purpose is admirably fulfilled here, and by frequent and regular inspection trips to the works and testing department of the Company under the direction of the college instructors, which trips constitute an integral part of the laboratory instruction, the students gain a very intimate knowledge of modern electrical apparatus of all types and sizes, not only when assembled and in operation and test, but also during their construction in the shops.

In equipping the college laboratory special consideration was therefore given to the selection only of such representative types of apparatus as can be handled, operated and tested by the students, and machines are of a size sufficiently large to correspond to modern practice, but not so large as to make the operation under abnormal conditions — that is, under conditions which as a rule are specially instructive — unsafe for the apparatus. All such machinery as the student can not be permitted to handle freely was excluded from the equipment.

Power is supplied from the following sources: A motor-

generator set consisting of a 55-h.p. 3-phase 240 volt synchronous motor direct connected to a 30-kw., 125 volt direct current generator; a motor-generator set consisting of a 17.5-kw. direct current generator direct connected to a 3-phase 220-volt induction motor; connection with the 550-volt direct current trolley circuit of the Schenectady Railway Company; connection with a three-phase 2300-volt power circuit of the Schenectady Illuminating Company. In the latter case voltage is reduced by banks of step-down transformers, so that the students can handle the safe low-tension circuits only.

A secondary supply for standardization of instruments is also secured by means of a group of lead plate storage batteries charged by a mercury rectifier upon the alternating current power circuit.

The laboratory equipment contains a large number of direct and alternating current generators and motors of various design and capacity suitable for testing and all of the general and much special experimentation, also a large number of transformers, coils, and condensers, and the measuring instruments suitable for the work.

In addition there are standardizing instruments for the accurate calibration of meters, and for determining resistance, inductance and capacity.

Numerous arc-lamps of different types are arranged for operation either by a constant current transformer or from direct current generators.

Students are introduced to the direct study of wave forms and some transient phenomena by the use of an oscillograph, and to the phenomena of very high frequency through work in the wireless laboratories.

For special study along the line of telephony, there is a complete set of apparatus presented by the Western Electric Company, including every part that comes into operation between two persons who may be located in different cities.

The general engineering department offers the following graduate course in residence:

Graduate Courses

The Degree of M. C. E. This course of one year's resident graduate study, consisting of lectures, laboratory and research work, is open to graduates of the general or the sanitary engineering course of Union College or of any other institution of a standing recognized by the faculty. On its successful completion the degree of Master of Civil Engineering is conferred.

The Degree of M. S. in E. E. To students desiring to continue their electrical studies a short time beyond the four-year course, a graduate course of one year is offered in which, besides instruction in higher branches of electrical engineering, advanced mathematics and physics, there will be occasion to carry out original investigations in electrical engineering practice on subjects closely connected with the most recent advance of electrical engineering. This course leads to the degree of Master of Science in Electrical Engineering, and is open to graduates of Union College or of other institutions approved by the faculty. The work is to be done in residence, but the lectures are given at such hours as frequently permit students and young engineers of the General Electric Company to attend.

A half year of college credit may be given exceptional students who complete the thorough and varied laboratory work of the student course of the General Electric Company and also attend during one year the graduate lectures at the college and do the prescribed work.

The following courses in electrical engineering are given:

E.E.101. A course dealing with electric transient phenomena and with problems in electro-dynamics.

E.E.102. A course which supplements E.E.101 and covers experimental work of an advanced character.

E.E.105. Lectures given at irregular intervals by Dr. Steinmetz on some phases of electro-physics.

The following courses in mechanical engineering are offered:

M.E.101. A course of lectures on hydrodynamics.

M.E.102. A course of lectures on elasticity.

M.E.103. A course of lectures on heat conduction.

The Degree of Ph. D. The degree of Doctor of Philosophy is not given on the completion of a certain amount of work or the study of stated subjects for a definite period of time, but is intended to be a mark of breadth of training and high attainment. It will be conferred upon the candidate who satisfactorily fulfills the following conditions:

1. A minimum of three full years of graduate work by residence is necessary in order to obtain the degree of Doctor of Philosophy.

2. The major subject of study must be electrical science.

3. Two minor subjects of study must be pursued, one of which is to be philosophy.

4. At the completion of the course, and two months before the conferring of the degree, a suitable thesis must be presented to the head of the electrical engineering department, representing original work and indicating strength and ability in independent investigation.

5. Fifty printed and bound copies of the thesis must be deposited in the college library before the successful candidate may receive the diploma for his degree. The degree may be conferred, however, before such copies are deposited, upon the presentation to the treasurer of proper security for their provision. In this case, a bound typewritten copy shall be placed in the library previous to the conferring of the degree.

Faculty members or students engaged in research work at the laboratories of the General Electric Company, under the direction of the head of the department of electrical engineering, or of the professor of electro-physics, at the college, not devoting their whole time to the work of the course, are given half time credit for work satisfactorily completed at the college.

Admission. The conditions governing admission to the graduate courses are given under the separate statements above. Correspondence regarding details should be addressed to the head of the department in which work is desired. (See page 97.)

CURRICULA OF ENGINEERING COURSES

Course Leading to Degree of B.E.

Freshman Year, all courses

First Semester

French I or 1a.....	(53)	3 hours
German I or 1a.....	(49, 50)	3 hours
English I.....	(55)	2 hours
Engineering Drawing GE1.....	(101)	3 hours
Mathematics 2.....	(66)	5 hours
Physiology and Hygiene I.....	(79)	2 hours
Lectures GE 30.....	(102)	1 hour

Total 19 hours

Second Semester

French I or 1a.....	(53)	3 hours
German I or 1a.....	(49, 50)	3 hours
English I.....	(55)	2 hours
Engineering Drawing GE I.....	(101)	2 hours
Mathematics 2.....	(66)	5 hours
Surveying GE 3.....	(101)	2 hours
Physiology and Hygiene I.....	(79)	2 hours
Commencement Term Work GE33.....	(103)	

Total 19 hours

One credit hour is required in Gymnastics

Sophomore Year, all courses

First Semester

Mathematics 4a.....	(67)	5 hours
Physics I.....	(68)	4 hours
Chemistry I.....	(70)	3 hours
English Literature 3.....	(56)	2 hours
Surveying GE 4.....	(102)	2 hours
Rhetoric 10.....	(57)	1 hour
Summer Vacation Work GE 32.....	(102)	

Total 17 hours

Second Semester

Mathematics 4a.....	(67)	3 hours
Physics I.....	(68)	4 hours
Chemistry I.....	(70)	3 hours
English Literature 3.....	(56)	2 hours
Descriptive Geometry GE2.....	(101)	3 hours
Rhetoric 10.....	(57)	1 hour
Lectures GE31.....	(102)	1 hour
Commencement Term Work GE33.....	(103)	

Total 17 hours

Junior Year, General Engineering, Option A*First Semester*

Applied Mechanics GE9.....	(105)	4 hours
Topographical Surveying GE5	(104)	2 hours
Hydraulics GE14.. ..	(106)	3 hours
Chemistry 2.....	(71)	4 hours
Economic Geology 6.....	(78)	2 hours
History 2.....	(59)	2 hours
Rhetoric 11.....	(58)	1 hour

Total 18 hours

Second Semester

Mechanics of Materials GE10.....	(105)	4 hours
Route Surveying and Highways GE6.....	(104)	4 hours
Thermodynamics GE13.....	(106)	2 hours
Geodesy GE8.....	(105)	4 hours
Electrical Machinery GE15	(107)	2 hours
History 2.....	(59)	2 hours
Rhetoric 11.....	(58)	1 hour
Commencement Term Work GE33	(103)	

Total 19 hours

Senior Year, General Engineering, Option A*First Semester*

Railroad Construction GE17.....	(107)	3 hours
Stresses GE11.....	(106)	5 hours
Motors GE18.....	(107)	4 hours
Engineering Law GE24.....	(108)	3 hours
Architecture GE19.....	(107)	1 hour
Economics 2	(64)	3 hours
One Literary Essay		
One Technical Essay		
Summer Vacation Work GE32	(102)	

Total 19 hours

Second Semester

Building Construction GE20.....	(108)	3 hours
Engineering Design GE12	(106)	5 hours
Engineering Law GE24.....	(108)	3 hours
Water Supply and Sewage GE16.....	(107)	5 hours
Mathematics 7.....	(67)	3 hours
Thesis GE34.....	(109)	

Total 19 hours

Junior Year, General Engineering, Option B*First Semester*

Applied Mechanics GE9	(105)	4 hours
Topographical Surveying GE5	(104)	2 hours
Hydraulics GE14.....	(106)	3 hours
Elements of Law GE25.....	(109)	3 hours
Economic Geology 6	(78)	2 hours
History I.....	(59)	4 hours
Rhetoric II.....	(58)	1 hour
Summer Vacation Work GE32	(102)	

Total 19 hours

Second Semester

Mechanics of Materials GE10.....	(105)	4 hours
Route Surveying and Highways GE6	(104)	4 hours
Thermodynamics GE13	(106)	2 hours
Elements of Law GE25	(109)	2 hours
Electrical Machinery GE15	(107)	2 hours
History I.....	(59)	4 hours
Rhetoric II.....	(58)	1 hour
Commencement Term Work GE33	(103)	

Total 19 hours

Senior Year, General Engineering, Option B*First Semester*

Finance GE26.....	(109)	3 hours
Stresses GE11	(106)	5 hours
Motors GE18.....	(107)	4 hours
Comparative Politics (History 5)	(60)	3 hours
Architecture GE19.....	(107)	1 hour
Economics I.....	(64)	3 hours
One Literary Essay		
One Technical Essay		
Summer Vacation Work GE32	(102)	

Total 19 hours

Second Semester

Building Construction GE20.....	(108)	3 hours
Engineering Design GE12	(106)	5 hours
Administration GE27.....	(109)	2 hours
Mathematics 7.....	(67)	3 hours
Economics I.....	(64)	3 hours
Comparative Politics (History 5)	(60)	3 hours
Thesis GE34	(109)	

Total 19 hours

Junior Year, General Engineering, Option C*First Semester*

Applied Mechanics GE9.....	(105)	4 hours
Topographical Surveying GE5.....	(104)	2 hours
Hydraulics GE14.....	(106)	3 hours
Chemistry 5.....	(75)	4 hours
Economic Geology 6.....	(78)	2 hours
History 2.....	(59)	2 hours
Rhetoric 11.....	(58)	1 hour
Summer Vacation Work GE32	(102)	

Total 18 hours

Second Semester

Mechanics of Materials GE10	(105)	4 hours
Route Surveying and Highways GE6	(104)	4 hours
Thermodynamics GE13.....	(106)	2 hours
Chemistry 5.....	(75)	4 hours
Electrical Machinery GE15	(107)	2 hours
History 2.....	(59)	2 hours
Rhetoric 11.....	(58)	1 hour
Commencement Term Work GE33	(103)	

Total 19 hours

Senior Year, General Engineering, Option C*First Semester*

Stresses GE11.....	(106)	5 hours
Motors GE18.....	(107)	4 hours
Engineering Law GE24	(108)	3 hours
Architecture GE19.....	(107)	1 hour
Heating, Ventilation and Sanitation GE21	(108)	3 hours
Economics 2.....	(64)	3 hours
One Literary Essay		
One Technical Essay		
Summer Vacation Work GE32.....	(102)	

Total 19 hours

Second Semester

Engineering Design GE12.....	(106)	5 hours
Engineering Law GE24.....	(108)	3 hours
Water Supply Sewage GE16.....	(107)	5 hours
Sanitary Analysis GE23	(108)	3 hours
Mathematics 7	(67)	3 hours
Thesis GE34.....	(109)	

Total 19 hours

Junior Year, Electrical Engineering*First Semester*

Advanced Mechanics ME1.....	(117)	4 hours
Electrical Engineering Theory EE1.....	(118)	3 hours
Electrical Engineering Laboratory EE2.....	(118)	4 hours
Mathematics 5.....	(67)	3 hours
History 2.....	(59)	2 hours
Rhetoric 11.....	(58)	1 hour
Summer Vacation Work		

 Total 17 hours
Second Semester

Advanced Mechanics ME2.....	(118)	5 hours
Electrical Engineering Theory EE2.....	(118)	3 hours
Electrical Engineering Laboratory EE23.....	(119)	3 hours
Mathematics 5.....	(67)	3 hours
History 2.....	(59)	2 hours
Rhetoric 11.....	(58)	1 hour

 Total 17 hours
Senior Year, Electrical Engineering*First Semester*

Thermodynamics ME3.....	(118)	3 hours
Electrical Engineering Theory EE3.....	(118)	3 hours
Electrical Engineering Laboratory EE22.....	(119)	4 hours
Seminar EE13.....	(119)	1 hour
Economics 2.....	(64)	3 hours
Electives.....	(117)	3 hours
Literary Essay		
Summer Vacation Work		

 Total 17 hours
Second Semester

Thermodynamics ME4.....	(118)	3 hours
Electrical Engineering Theory EE4.....	(119)	3 hours
Electrical Engineering Laboratory EE24.....	(120)	4 hours
Seminar EE14.....	(119)	1 hour
Electrical Apparatus Design EE34.....	(120)	3 hours
Electives.....	(117)	3 hours

 Total 17 hours

ATTENDANCE AND STANDING

Registration. Every student must report at the registrar's office at the beginning of each semester and register college or local residence.

Any change of residence during the semester must be reported at once at the treasurer's office.

Changes of Course. Students are not permitted to pass from one course to another, or to take any studies out of their regular order, without the specific authorization of the faculty.

Chapel. Morning worship is held in the chapel every college day and attendance is required of all students.

Reports. A daily record of scholarship and of attendance at class and chapel is kept and a report is sent at the close of each semester to the student's parent or guardian.

Standing. There are four grades of scholarship:—from 9 to 10 inclusive, first grade; from 8 to 8.9, second grade; from 7 to 7.9, third grade; from 6 to 6.9, fourth grade.

A student who receives a mark of 4 to 5.9 is reported as conditioned; below 4, as having failed.

A student who is reported as having failed in any subject must take that subject again in class; or he may be required, at the option of the department concerned, to make up the subject under an approved tutor, in such manner as the department may designate, and to pass an examination in it at the second conditions examination after the imposition of the mark of failure.

Students of exceptional standing in scholarship, not exceeding ten in number, are eligible for selection by the faculty for stage appointments at graduation.

Absences in General. Absences are entered against a student from the beginning of a semester until he reports his return to the registrar.

It is expected that for consecutive absences permission will be obtained in advance.

Permissions and excuses are given only by the committee on absences which meets every Monday afternoon from 2 to 5 o'clock.

Applications for excuses must be made on the first Monday following the date of the absence.

Class-room Absences. Attendance at all exercises is required and it is expected that no student will be absent except in case of unavoidable necessity.

No excuse remits any college work. The work lost by reason of excused absence must be made up in a manner satisfactory to the head of the department concerned, unless the nature of the work renders this impossible, in which case the student's grade will suffer.

After a number of unexcused absences equal to three weeks of recitations in any subject, the student is not allowed to continue his work in that subject, but must take it with the succeeding class.

Chapel Absences. Chapel attendance is recorded in terms of approximately twelve weeks each. Twelve absences without excuse are allowed each term. All absences after the first twelve lower the standing at the rate of one unit for every two absences.

No absences are excused except for protracted illness or for reasons in every way exceptional.

Applications for excuse from chapel for a term must be made within the first two weeks of that term.

In the determination of a student's general standing, marks for chapel attendance are counted as the equivalent of a one hour per week recitation. They affect the granting of scholarships and the selection of honor men.

Conditions. If entrance conditions are allowed, they must be made up promptly at the time appointed. Students who have any entrance conditions remaining after the April examinations, are classed as irregular students. Those who fail to remove all entrance conditions before the beginning of the next college year will not be admitted to any of the work of that year. No student who has any conditions unsatisfied at the close of the conditions examinations in September at the opening of the college year, is permitted to continue with his class without the express authorization of the faculty.

Conditions not removed at the next conditions examination held after their imposition must be made up in class at the first opportunity, and this work takes precedence of the regular work in case of conflict in the schedule. No senior who has failed to make up all his back work by the end of the first semester of senior year can be recommended for a degree, except by special vote of the faculty.

Examinations for the removal of conditions occur on the Saturday next preceding the opening of the first semester, and in December and April, on dates indicated in the college calendar. Registration for these examinations closes at 12 M. on the Saturday next preceding the date set for each. A fee for each examination to be taken must be paid at the time of registration, at the college office.

Students who have been excused by the dean, in writing, from any semester examination are reported "Not examined" and may be examined later, at a time to be approved by the instructor, but such examination cannot be postponed beyond the first conditions examinations after such report. A failure to pass is regarded as a condition and must be made up at the next following conditions examination.

Unless excused in writing by the dean, students absent from semester examinations are reported as "Not sustained," or "Failed."

Absence from any appointed examination is regarded as a failure, unless previously excused.

Irregular Students. Students who are seriously deficient in standing may be dropped to a lower class, or if the deficiency is such as to leave a prospect of regaining class standing, may be rated as irregular students. Irregular students have no class relation or class privilege; they are debarred from competition for prizes and from the attainment of special honors.

The evidence that a student's continuance in college is resulting in no advantage to himself, or in harm to others, will occasion his separation from the institution.

EXPENSES

Registration fee.....	\$5.00
Tuition, A. B., Ph. B. and B. S. courses, per year.....	90.00
Tuition, engineering courses, per year.....	150.00
Graduate courses in engineering, per year.....	75.00
Room rent in dormitories, per year.....	\$50 to 100.00
Incidental fee, for maintenance of grounds and public rooms, use of library, gymnasium, etc., per year.....	24.00
Graduation fee, including diploma.....	15.00
Chemical laboratory fees:	
Courses 1 and 1a, per year.....	24.00
Courses 2, 2a, 3, 4 and 5, per year.....	45.00
Course 6, per year.....	60.00
Electrical laboratory fees:	
Junior year, per year.....	21.00
Senior year, per year.....	30.00
Biological laboratory fees:	
Course 1, per year	6.00
Course 3a, per year	12.00
Course 3b, per year	12.00
Physics laboratory fees:	
Course 1 and 1a, per year.....	15.00
Course 2, per year	20.00
Conditions examination fee.....	2.00
Fee for certificate of work done.....	2.00
Fee for certificate of graduation.....	1.00
Master's degree, registration and diploma.....	20.00

In the course leading to the degree of Doctor of Philosophy the maximum payment will be \$300 if the degree be earned in five years from the time of registration.

One-half of tuition and other fees is due in advance on the first day of each semester, and is not returnable. Students who pay by check must have certified or cashier's check, or New York draft.

Students must conform to the rules of the treasurer's office regarding registration at the opening of each semester, and will

not be admitted to any classes or laboratories until the required fees are paid.

No deductions are made because of absence from college.

No part of a semester bill will be refunded for any cause.

Damage done by students to college property will be charged to their account.

No degree, certificate or dismissal will be given to any student until his bills are paid.

Board can be procured for \$4 to \$5 a week.

It is the custom of the student body to levy an annual campus tax of sixteen dollars, of which one-half is payable at registration on the first day of each semester. This money is used for the support of the different branches of athletics and of the musical association.

College Rooms

The college has three steam-heated dormitories. Most of the rooms are arranged in suites of two; they are rented at prices varying from \$50.00 to \$90.00 per year unfurnished and \$60.00 to \$100.00 per year furnished for each student occupying a room. Students about to enter college who wish rooms in the dormitories should make early application to the assistant treasurer for a list of rooms giving location and price. No room is secured until a lease is signed and filed in the college office; a student must occupy the room for which he signs, as transfers are not allowed. The rooms are cared for by competent persons, employed and paid by the college; each occupant of a college room will be held responsible for any damage done to the room. At the end of the college year students giving up their rooms for any reason whatsoever must remove all furniture and property from their rooms not later than the Saturday following commencement day, as after this time the dormitories will be closed until the Saturday before the first registration day of the fall semester. The dormitories will also be closed during the Christmas recess.

Students leaving property in their rooms during the vacations do so at their own risk.

It is expected that students not living at home will room in the college dormitories, or if no college rooms are available, in places

approved by the college. A list of such rooms may be found at the college office.

Employment Bureau

The Christian Association acts as a bureau with the object of giving assistance to students who desire employment for the purpose of meeting the expenses of a college education. A considerable number of students meet the expense of board by acting as waiters in the various restaurants and boarding houses in the city. Others find employment as clerks in stores on Friday evenings and Saturday afternoons; others in caring for furnaces and in other work about private residences. Applications for the assistance of the bureau may be addressed to the secretary of the faculty.

SCHOLARSHIPS

Funds given especially for this purpose enable the college to offer aid to a number of students each year, as follows:

General Scholarships. General scholarships are available for students in the A. B., Ph. B. and B. S. courses.

Scholarships covering a part or the whole of the tuition charges are granted to students upon the following conditions:

1. The declaration of a purpose to remain in Union College until graduation.

2. An acknowledgment that the aid received is regarded as a debt of honor, to be paid as soon as possible after leaving college.

3. The presentation of satisfactory evidence of financial need.

Scholarship aid will be withdrawn temporarily upon the failure of the student to be sustained in any subject, or upon his failure to maintain an average grade of eighty per cent. in the studies of any term, and after it has been withdrawn for two successive semesters it will not be renewed.

Any serious breach of college discipline, evidence of moral delinquency, or repeated unnecessary expenditures will also result in the withdrawal of scholarship aid.

Credentials necessary for admission to another college will not be given to any scholarship student until he has repaid to the college treasury the full amount of scholarship aid received.

Application blanks will be provided by the secretary upon request.

John David Wolfe Memorial Scholarships. The income of a fund of fifty thousand dollars established by the generosity of Miss Catharine Lorillard Wolfe is designed to aid students from the southern states.

These scholarships are available for students in all courses and are governed by the conditions named above.

Application blanks will be provided by the secretary upon request.

Levi Parsons Scholarships. A generous benefaction by the late

Hon Levi Parsons, of Gloversville, N. Y., maintains several scholarships in each class, yielding one hundred and fifty dollars a year each.

Among applicants, preference is given:

First, to blood relatives of the founder, bearing his name and living in the county of Fulton, Montgomery or Hamilton, in the State of New York, and especially to those bearing his name and living in Gloversville or Johnstown, Fulton county.

Second, to applicants living in the following places, according to the following order:

1. The city of Gloversville, Fulton county.
2. The city of Johnstown.
3. The township of Johnstown.
4. The county of Fulton.
5. The adjoining counties of Montgomery and Hamilton.
6. The blood relatives living in any other part of the United States.

Nomination to scholarships is made by the board of directors of the Gloversville Free Library; and the nominees must satisfy the college requirements for admission. Applications are received by the directors of the Gloversville Free Library, Gloversville.

The continuance of these scholarships is subject to the rules stated on page 136 concerning the withdrawal of the general scholarships of the college.

Thomas Armstrong Scholarships. The late Thomas Armstrong, of Plattsburg, N. Y., provided for the grant of scholarships to residents of Clinton county, sons of practical farmers.

Nominations to these scholarships are made by the board of supervisors of Clinton county, and the yearly value of each scholarship is not to exceed two hundred dollars.

R. C. Alexander Prize Scholarship. The sum of four thousand dollars has been given in memory of the late Robert Carter Alexander, of the class of 1880, and a life trustee of the College, to be devoted to the establishment of a scholarship for the encouragement of classical studies.

The income of this fund, amounting to two hundred dollars

per year, is awarded as a prize scholarship, upon the following conditions:

1. Candidates must be students in the classical course, and of approved moral character.

2. They must be free from conditions and must have obtained an average of at least eighty per cent. in the studies of the first two terms of the freshman year.

3. They must pass successfully a special examination at the close of the freshman year in each of the following subjects: Latin, Greek, mathematics, English composition, and either French or German. These examinations will be based upon the work of the freshman year.

4. The award will be made to the candidate obtaining the highest general average in these examinations and in all the previous work of the college course.*

5. The prize scholarship will be forfeited upon evidence of moral delinquency, or upon failure to maintain an average grade of ninety per cent. in the work of any subsequent term. The scholarship, once lost, cannot be regained, but will be awarded, upon the above conditions, to a student in the next entering class.

6. All questions pertaining to the administration of this scholarship will be determined by a committee composed of the president of the college, the chairman of the scholarship committee of the faculty, and a member of the board of trustees.

Horace B. Silliman Scholarships. Three scholarships were founded by the late Horace B. Silliman, of the class of 1846, giving to each recipient the income from two thousand dollars annually.

These scholarships are awarded to active members of the college Young Men's Christian Association by a committee composed of the president, the dean, and the president of the Young Men's Christian Association, under such rules and conditions as may be determined by such committee, preference being given to students in the classical course.

The award is made to one student annually at the close of the freshman year.

*This scholarship is now held by John Charles Younie, of the class of 1918.

Daniel F. Pullman Scholarship. The late Daniel F. Pullman, of Knox, Albany county, New York, provided in his will for the establishment of a scholarship of the value of \$120 a year, to be given to a student in the classical course.

The award is made by the faculty, and in accordance with the terms of the will preference is given to members of the Methodist Episcopal Church.

Alumni Scholarships. Application for appointment to these scholarships must be made before September 1. The conditions with respect to college standing governing the award of the general scholarships of the college apply to this scholarship also.

Class of 1895 Scholarship. A fund has been given by the class of 1895 which provides for the grant of a scholarship of a yearly value not to exceed one hundred dollars. The award is made by the faculty and, in accordance with the wish of the donors, preference will be given to descendants of members of the class.

Graduate Council Scholarships. A fund is given by members of the class of 1887 which provide for two scholarships of the yearly value of one hundred dollars each. These scholarships are subject to the general rules of the college as regards class standing and personal conduct (page 136). The award is made by the donors on nomination by the secretary of the council.

Daniel Vedder Scholarship. By the will of the late Daniel Vedder, of Schenectady, a scholarship has been established, of the annual value of two hundred dollars.

The scholarship is awarded by the faculty, and is given to a student who is preparing to enter the Christian ministry.

The holder must maintain an average standing of ninety per cent., and must pledge himself to abstain from the use of intoxicating liquors and tobacco.

If none of the candidates meets in every respect the conditions stated in the will of the donor, the scholarship will be awarded in such a way as to carry out as fully as possible the wishes of the founder.

The award is made at the end of the freshman year.

Ichabod Spencer Scholarship Fund. The sum of four thousand dollars, to be known as the Ichabod Spencer Scholarship Fund and to be used for general scholarship aid, has been given by Mrs. Catherine Spencer Leavitt in memory of her father, the Rev. Ichabod Spencer of the class of 1822. The proceeds of this fund are used at the discretion of the trustees to aid worthy students in securing an education at Union College.

Law School Scholarships. Applicants for these scholarships, described below, must register with the dean of the college by May 15 of senior year.

John K. Porter Memorial Scholarships. A fund given by Mrs. John K. Porter, in memory of her husband, is designed to assist students who, after graduating from college, pursue the study of law. The fund provides, at present, for three scholarships of ninety dollars each. The awards are made at commencement to seniors chosen by the faculty.

Gilbert M. Spier Memorial Scholarship. A fund given by Mrs. Glover C. Arnold, in memory of her father, the late Judge Gilbert M. Spier, provides another scholarship for students of law who go from Union College to the Albany Law School, another department of Union University. The sum of ninety dollars is awarded at commencement to the senior chosen by the faculty, the choice being made on the basis of excellence in historical studies.

William C. Saxton Scholarships. By the will of Anna C. Saxton the sum of ten thousand dollars was bequeathed to Union College for the purpose of founding the William C. Saxton Fund. This fund provides for the payment of the tuition of one student in each of the three classes in the Albany Law School. These students must be graduates of Union College and are appointed, one each year, by the faculty of Union College. The first appointment will be made in 1917.

Erie County Scholarships. Through the generosity of Mr. Thomas B. Lockwood of Buffalo, Union College is enabled to offer a certain number of scholarships annually to graduates of registered high schools in Erie county.

The tenure of the scholarships is subject to the general scholarship rules of the college as published in the annual catalogue.

Chester C. Thorne Scholarship. The late Rev. Chester C. Thorne, of the class of 1857, has endowed a scholarship of the annual value of two hundred dollars. The scholarship will be awarded to a student in one of the academic courses at the end of his junior year; it is given on the basis of character and financial need and is awarded by the faculty.

The tenure of the scholarship is subject to the general scholarship rules of the college as published in the annual catalogue.

Genesee Valley Scholarships. The Alumni Association of the Genesee Valley generously offers a scholarship to residents of towns included in the active membership of the association.

Candidates should make application to the secretary of the Alumni Association.

The tenure of the scholarship is subject to the general scholarship rules of the college as published in the annual catalogue.

General Electric Company Scholarships. The General Electric Company has made provision for three scholarships, nominations to which are made by the company. One incumbent will be named each year until three scholarships are in effect. The scholarships are intended primarily for the encouragement of electrical engineering studies, but the company may appoint students in any course. The scholarships provide for tuition fees.

Cornelia Veeder Scholarship. By the will of Miss Cornelia Veeder, the sum of four thousand dollars is given to Union College, the income "to be expended annually in the support and education of some poor and worthy student in said college."

William L. Oswald Scholarship. A fund of five thousand dollars is provided by the will of William L. Oswald, the income from which is to be applied to "the support and education of a young man of proper character and habits for the duties and calling of a minister of the Gospel, a candidate of suitable qualifications residing in Watervliet, N. Y., to be preferred."

PRIZES

The following prizes are awarded from funds given especially for this purpose:

Blatchford Oratorical Medals. The Hon. Richard M. Blatchford, LL. D., of New York city, founded oratorical prizes, consisting of two gold medals of the value of the interest on \$1,000, which are given to the two members of the graduating class who deliver at commencement the best orations, "regard being had alike to their elevated and classical character and to their graceful and effective delivery." These medals are awarded by a committee appointed by the trustees, and are presented at the close of the exercises.

Warner Prize. The Hon. Horatio G. Warner, LL. D., of Rochester, N. Y., founded an annual prize to be presented at commencement to the "graduate of Union College, classical or Latin-scientific course, who shall reach the highest standing in the performance of collegiate duties, and also sustain the best character for moral rectitude and deportment, without regard to religious practice or profession." The prize is a silver cup and is awarded by the faculty.

Ingham Prize. The Hon. Albert C. Ingham, LL. D., of Meridian, N. Y., founded an annual prize of the interest of \$1,000 (in the form of plate, or medal, or money, or both medal and money, as preferred), to be awarded at commencement to that senior connected with the college for not less than two years who shall offer the best essay on one of two assigned subjects in English literature or history.

The essay must be typewritten, and must contain not less than 4,000 nor more than 4,500 words. Its signature (fictitious) and the writer's real name must be enclosed in a sealed envelope; the signature and the name of the prize being given on the outside. The essay, with the note, must be presented by noon on the first day of May.

Allen Essay Prizes. The Hon. William F. Allen, LL. D., of Oswego, N. Y., established a fund of \$1,000, the interest of which

is devoted to prizes for the best three essays on any subject, submitted by members of the senior class.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham essay) by noon on May 1st. The prizes are awarded at commencement.

Oratorical Prizes. Prizes are presented at commencement to the two juniors and the two sophomores who deliver the orations best in composition and delivery on the occasion of prize speaking in commencement week. Four juniors and four sophomores are selected for this competition by a committee of the faculty on the fifteenth of April. Candidates must be in full standing on appearance before the committee.

Allison-Foote Prizes. Mr. George F. Allison, of New York city, and the late Wallace T. Foote, of Port Henry, N. Y., founded a prize for the encouragement of debate in the literary societies. The prize consists of \$100 in cash, and is awarded as the result of a public competition between representatives of the Adelpic and Philomathean Literary Societies. Fifty dollars is awarded to the society presenting the strongest argument. The remaining \$50 is awarded to the debater who makes the best single speech, regardless of his society relations. Contestants must have engaged in at least ten debates in their respective societies during the college year immediately preceding. All further details are left to the determination of a committee, consisting of the president, the dean of the college, and the professor of Rhetoric.

Daggett Prize. In 1899 Miss E. Josephine Daggett bequeathed to Union College the sum of \$1,000, the interest of which is devoted to a prize for conduct and character, without respect to scholarship, to be given at Commencement to a senior who shall have passed through a full course of four years at the college.

Pullman Prizes. Mr. Daniel F. Pullman, of Knox, Albany County, New York, bequeathed to Union College the sum of \$2,000 to found two annual prizes.

The Pullman Classical Prize. This prize of \$40 is given to that member of the Methodist Episcopal Church in the graduating

class who, in an attendance of three years, has attained the highest standing in scholarship in the classical course.

The Pullman Engineering Prize. This prize of \$40 is given to that member of the graduating class who has taken the full course in the engineering department and who has attained the highest standing in that course, preference being given to members of the Methodist Episcopal Church.

Baggerly Prizes. Mr. H. L. Baggerly, of the class of 1894, has founded two prizes to be offered annually for the best essays on a question of economics or government. The topic is announced at the beginning of the winter term. The prizes are of \$50 and \$25, and are open to competition by members of the senior and junior classes.

The essay must be typewritten, and must contain not less than 2,500 nor more than 3,000 words, and must be signed and presented (with note, as in the case of the Ingham and Allen essays) by noon on May 1st.

The award is made by a committee of the faculty.

Bailey Prize. A silver cup, of the value of \$50, has been offered by Dr. Frank Bailey, to be awarded annually to that member of the senior class who has rendered the greatest service to the college in any field. In awarding this prize, consideration will be given to any effort resulting in conspicuous improvement in the conduct of athletic sports or in the character of undergraduate publications; in the increase of college enthusiasm or the elevation of the tone of college life; in the advancement of the interests of the college among preparatory schools or in the community as a whole; or in any addition to those things which bring honor to the name of Union.

Van Orden Prize. The Van Orden Prize was founded by the late Wessel Ten Broeck Van Orden in memory of his uncle, Wessel Ten Broeck Van Orden, of the class of 1839. It is awarded annually to a member of the freshman class for excellence in English composition. The basis of the award is the class work in rhetoric and composition, and a special essay. The essays are based upon certain works of English literature, the titles of

which are announced early in the fall. The prize is the interest on \$1,000, and is awarded partly in books and partly in money.

Goodrich-Duane Prizes. Two prizes, of \$30 and \$20, are awarded to the best speakers in an extemporaneous debate held in commencement week in each year. A general topic is previously announced, and the particular subject of debate is given on the evening of the contest. The competition is open to students of all classes.

The first prize is given by Mr. James A. Goodrich, of the class of 1879, and the second prize by Dr. Alexander Duane, of the class of 1878.

American History Prize. A prize of \$25 has been offered by Willis T. Hanson, Jr., A. M., for the best thesis on a topic dealing with the history of Schenectady.

The essays must be typewritten in duplicate and must contain not less than 4,000 words. Both copies must be submitted not later than May 15th to the head of the Department of History. The award will be made under the direction of this department, preference being given to theses based upon original sources.

Debate Medals. Intercollegiate debate medals are awarded by the Union College Debating Council each year to those students who worthily participate in at least two intercollegiate debates during the academic year.

Underclass Debate Prize. A prize of \$10 is awarded to the member of either debating teams in the Sophomore-Freshman debate who makes the best single speech, regardless of class victory.

Ernst J. Berg Scholarship Cup. A silver cup is offered by Dr. Ernst J. Berg, to be awarded at the opening of the fall term, to that fraternity or like organization whose scholarship during the preceding year was highest.

Fuller Prizes in Chemistry. In 1914 Dr. Robert M. Fuller, of Schenectady, N. Y., founded two prizes, consisting of a silver, and a gold medal, of the value of twenty dollars and thirty dollars respectively. These medals are awarded annually; the

silver medal to that member of the sophomore class whose work of the first two years in the department of chemistry has given the greatest promise of a successful career in that subject; the gold medal to that member of the senior class whose standing in the department has been of high grade, and who has shown the most ability in original experimental work. The medals are awarded by a committee composed of the president, the professor of chemistry, and one other member of the faculty appointed by the president.

Freling H. Smith Prize in History. Mr. Freling H. Smith, of the class of 1865, has founded an annual prize of fifty dollars in the department of history. The prize is awarded at commencement and is open to seniors who are qualified to take special honors in history. The award is based upon a thesis written under the direction of the department of history. Candidates must register with the head of the department not later than November 1.

DEGREES AND HONORS

The candidate for a degree must have paid all dues to the college treasurer, and returned all books borrowed from the college library; he must also attend the conferring of degrees, or be expressly excused therefrom. The candidate for a bachelor's degree must have entered college not later than the beginning of the first senior term.

Degrees for Resident Study

The degrees of the college are conferred by authority of the board of trustees upon candidates who have successfully completed courses of resident study, as follows:

The Bachelor's Degree. The degree of Bachelor of Arts (A. B.) will be conferred upon candidates who have successfully completed Course 1, page 29; the degree of Bachelor of Philosophy (Ph. B.), upon those who have successfully completed Course 2, page 29; the degree of Bachelor of Science (B. S.), upon those who have successfully completed Course 3, page 29; the degree of Bachelor of Engineering (B. E.), upon those who have successfully completed Course 4, Option A, B, or C, pages 29-30.

The Master's Degree. The degree of Master of Civil Engineering (M. C. E.) will be conferred upon candidates who have successfully completed Course 7, first division, page 30; the degree of Master of Science in Electrical Engineering (M. S. in E. E.), upon those who have successfully completed Course 7, second division, page 30.

The Doctor's Degree. The degree of Doctor of Philosophy (Ph. D.) will be conferred upon students of electrical science who fulfill the requirements stated on page 124.

Degrees for Non-Resident Study

The following degrees for non-resident study may be conferred upon graduates of Union College who meet the requirements specified below:

Academic Degrees. The degree of Master of Arts (M. A.) or

of Master of Science (M. S.) will be given to graduates of Union College who have been registered as candidates for the degree not less than two years, have completed definite courses of advanced study in two departments, and have submitted a satisfactory thesis and passed satisfactory examinations. The total amount of work done is intended to be the equivalent of one year of resident study.

A year of resident study in any non-professional graduate school, approved at the time of registration by the two departments concerned, will be accepted instead of the two years' study above mentioned on fulfillment of the same conditions regarding thesis and examinations.

Each candidate for this degree must register with the dean of the college his name, his address, and the two departments chosen, not later than the fifteenth of October of the year for which he desires registration.

The thesis must be presented to the dean by May first for submission to the faculty in time to provide for all necessary examinations before commencement.

A fee of \$20 is charged, which covers examinations and diploma; of this amount \$10 is payable at the time of registration and \$10 at the time of the final examinations.

Engineering Degrees. On fulfilling the conditions prescribed below graduates of Union College in the general and sanitary engineering courses may become candidates for the degree of Civil Engineer (C. E.); graduates in the course in electrical engineering may become candidates for the degree of Electrical Engineering (E. E.)

The candidate, after the completion of his undergraduate course must have been engaged for at least three years in professional engineering work of a high order and in positions favorable to the acquisition of valuable engineering experience and to the development of professional ability and judgment.

If the candidate's professional experience is found adequate in character and amount, he is required to submit a satisfactory thesis on an approved subject embodying a contribution by himself to engineering knowledge or literature.

If the thesis is found satisfactory the candidate may be called before an examining committee selected by the department in which he is a candidate and must satisfy the committee that his training, experience, judgment and ability are such as to warrant the conferring of the degree.

If, in the opinion of the head of the department concerned, the candidate has satisfactorily met the above requirements he may be recommended for his degree, to be conferred by the trustees at the following commencement.

The diploma fee for this degree is \$10.

Honors

All commencement prizes are limited to A. B., Ph. B. or B. S. students who have entered at or before the beginning of the senior year, and who are in full standing at the close of the first semester; and to engineering students entered likewise and in full standing at the close of the first semester, in both the engineering course and the English department of the B. S. or Ph. B. course.

Commencement Appointments. These honors may be assigned to ten seniors, as stated under Standing, page 130. Provisional appointments are made at the close of the first semester of senior year, and become final if those who receive them retain the same relative rank to the end of their course. Under present regulations, no other person can become competitor for the Blatchford Oratorical Medals.

Seniors not in full standing at the close of the first semester are ineligible to a Commencement appointment.

Students who receive Commencement appointments as the result of the second semester's work are excused from speaking unless the faculty direct otherwise.

The Valedictory. This honor is awarded to the senior of highest standing among the ten receiving Commencement appointments.

Special Honors. Special honors are also given at graduation under the following conditions: Any department may offer a

course, approved by the education committee, leading to special honors. The head of a department may direct the choice of electives in other departments, for honor students, to the number of six hours in each year. The time of registration for honors will be determined separately for each department. The candidate for special honors must have attained in all the studies of the department in which he tries for honors a rank of not less than ninety per cent. of the maximum. The evidence that he has successfully completed the extra course prescribed for him must be submitted not later than June 1st of the senior year to the faculty, who shall decide in each case whether the work is worthy the names of the students who take honors are printed on the of an honor. The honors attained are stated in the diploma, and Commencement programme. No student may try for honors in more than two departments.

Phi Beta Kappa. At the beginning of the second semester of the senior year, one-third of the members of the graduating class in the classical course, candidates for the degree of Bachelor of Arts, may be elected to membership in the Phi Beta Kappa society. The election is based upon scholarship and character and is given, as a rule, to the men who stand highest in scholarship in their class.

The Alpha of New York chapter was established in 1817; and ever since that time election to the society has been one of the highest distinctions to be gained by scholarship.

Sigma Xi. Election to the honorary scientific society of Sigma Xi, is one of the honors open to seniors of marked ability in the scientific and engineering departments. Membership is confined to the faculty, senior candidates for graduation, and alumni. The election occurs during the latter part of the senior year and selections are made on the basis of high general scientific or engineering ability and particularly as a mark of promise of ability in research and independent work.

The society was founded at Cornell University in 1886 and has chapters at more than twenty of the leading colleges and universities of the country. The Union chapter was established in 1887, since which time about one hundred members have been elected by this chapter.

DEGREES CONFERRED
AT THE
ONE HUNDRED AND TWENTIETH ANNUAL
COMMENCEMENT

JUNE 14, 1916

Honorary

Myron T. Herrick.....Cleveland, O.
George Alexander.....New York City

D. D.

Edward C. Johnson.....Kansas City, Mo.

L. H. D.

N. Lansing Zabriskie.....Aurora

Litt. D.

Edwin Anson Strong.....Ypsilanti, Mich.

M. A.

Charles S. Stanton.....Chicago, Ill.
Daniel Seymour.....New York City

In Course

M. A.

Maurice Robinson Brown.....Amsterdam

M. S.

Warren Chase Vosburgh.....New York City

M. S. in E. E.

Wallace Bryant Kirke.....St. Paul, Minn.
Edmund Wetmore Moore.....Rochester

B. E.

Orlando Ferreira Da Rosa.....Sao Paulo, Brazil

(As of the Class of 1915)

Class of 1916

A. B.

Mulford David De Forest.....	Schenectady
Lee Chase Fletcher.....	Gillett, Pa.
William Carroll Gunning.....	Freeport
Avrom Myer Jacobs.....	Albany
Milton De Forest Ketchum.....	Wynantskill
Milton Hijmes Sternfeld.....	Albany
James Barker Taylor.....	Greenville
Richard Erastus Taylor.....	Greenville

Ph. B.

Charles Foster Brown.....	Schenectady
Kenneth Creble.....	Feura Bush
Kenneth Boardman Hanson.....	Albany
Raymond Howard Rollins.....	Kennebunkport, Me.

B. S.

Harlan Barrett Allen.....	Lowville
William Mansfield Clinnick.....	Schenectady
Revington Lyman Embree.....	Stamford, Ct.
Harold Brooks Gardner.....	Meadowdale
Paul Alfred Hauenstein.....	Buffalo
Eugene J. Hummer.....	Ravena
Cornelius Duane Lowell.....	Mt. Clements, Mich.
Philip Tage Mallen.....	Chicago, Ill.
Barron Peck Reed.....	New York City
Karl Montgomery Stoller.....	Schenectady
Leon Blanchard Streeter.....	Lake George
Leland Russell Van Wert.....	Melrose
Schuyler Vroman.....	Middleburg
Horace Zimmer.....	Gloversville

B. E.

Walter Ransom Gail Baker.....	Schenectady
Lucius Eugene Baldauf.....	Eden
Meade Brunet.....	Petersburg, Va.

Walter Allen Churchill.....	Oswego
Peter John Matthew Clute.....	Schenectady
Carl Frederick Danner.....	East Aurora
George Edward DeRouville.....	Albany
Harry Clifford Dikeman.....	Freeport
Lloyd Elmer Dunkelberger.....	Lockport
Donald Alexander Ennis.....	Scotia
Santiago Escalante.....	Tariba, Venezuela
Nathaniel Augustus Finch, Jr.....	Buffalo
John Flam	Schenectady
Walter Franck	Schenectady
Edmund Everett Garrison.....	Yonkers
Howard Allen Glenn.....	Scotia
Joseph Howard-Soler.....	New York City
Albert Ingalls Howd.....	Schenectady
Daniel Jerome Keleher.....	Port Chester
James Taylor Landreth.....	Schenectady
Harold Miller Lewis.....	Geneva
James Vincent Mauro.....	Gloversville
George Glenn Mercer.....	Schuyler Lake
Ralph Merton Mixter.....	Warren
Millard Harold Moulds.....	Selkirk
Raymond Arthur Newton.....	Sydney
José De Assis Ribeiro.....	Sao Paulo, Brazil
Howard Britton Santee.....	Williamson
Robert Thomas Scully.....	Schenectady
Carlton Newell Smith.....	Schenectady
José Cuba De Souza.....	Sao Paulo, Brazil
Benjamin Spraragen	Warwick
William Spraragen	Warwick
Charles Van Orden Terwilliger.....	Albany
Xenophon Demetrius Theocharides.....	Marsovan, Turkey
Leon Edward Turpit.....	Elnora
Walter Ebsworth Wynne.....	Albany

AWARDS 1916**Valedictory**

James Barker Taylor.....Greenville

Commencement Orations

Lee Chase Fletcher.....Gillett, Pa.

William Carroll Gunning.....Freeport

Avrom Myer Jacobs.....Albany

Walter Hijmes Sternfeld.....Albany

Richard Erastus Taylor.....Greenville

Charles Van Orden Terwilliger.....Albany

Walter Ebsworth Wynne.....Albany

Engineering Theses

José De Assis Ribeiro.....Sao Paulo, Brazil

John FlamSchenectady

Charles Van Orden Terwilliger.....Albany

Walter Ebsworth Wynne.....Albany

Special Honors

In Greek..... James Barker Taylor.....Greenville

In Latin..... James Barker Taylor.....Greenville

Richard Erastus Taylor.....Greenville

In Philosophy..... Lee Chase Fletcher.....Gillett, Pa.

William Carroll Gunning.....Freeport

Eugene J. Hummer.....Ravena

Avrom Myer Jacobs.....Albany

Milton Hijmes Sternfeld.....Albany

Prizes

Blatchford Oratorical Medals. 1st, Avrom Myer Jacobs; 2nd, Richard Erastus Taylor.

Warner Prize. James Barker Taylor.

Allen Prizes. Avrom Myer Jacobs, Milton Hijmes Sternfeld, Lee Chase Fletcher.

Prizes for Oratory. Juniors: David Ferdinand Chapman, Hugh J. Williams. Sophomores: Ko Gyee Leong, Clyde Alexander Heatley.

Allison-Foote Prizes. Won by the Philomathean Society and Clyde Alexander Heatley.

Daggett Prize: Carl Frederick Danner.

Pullman Prizes. Lee Chase Fletcher, Walter Ebsworth Wynne.

Bailey Prize. Meade Cook Brunet.

Van Orden Prize. Brenton Thompson Taylor.

Goodrich-Duane Prizes. Milton Hijmes Sternfeld, Jacob Mitchell Frankel.

Ingham Prize. Peter J. M. Clute.

American History Prize. Harold Brooks Gardner.

Horace B. Silliman Scholarship. Warren George Kelsey.

John K. Porter Memorial Scholarship. Charles Foster Brown.

Donald A. Coulter Debate Prize. Leslie Samuel Uphoff.

Fuller Prizes in Chemistry. William Mansfield Clinnick, August John.

Freling H. Smith Prize. Avrom Myer Jacobs.

Electrical Engineering Seminar Prizes. George Glenn Mercer, Daniel Jerome Keleher.

Ernst J. Berg Prize. Pyramid Club.

Phi Beta Kappa

Lee Chase Fletcher

Walter Hijmes Sternfeld

William Carroll Gunning

James Barker Taylor

Avrom Myer Jacobs

Richard Erastus Taylor

Sigma Xi

Walter Ransom Gale Baker

George Glenn Mercer

Meade Cook Brunet

José de Assis Ribeiro

John Flam

José Cuba da Souza

Richard Daniel Kleeman

Mortimer Freeman Sayre

James Taylor Landreth

Charles Van Orden Terwilliger

Xenophon Demetrius Theocharides

ALBANY MEDICAL COLLEGE

The Albany Medical College was organized in 1838 and incorporated in 1839, in which year its first class was graduated. In 1873, by the incorporation of Union University, the school of medicine in Albany was united with Union College in Schenectady only a few miles distant. The relationship was, however, only nominal, for the medical school was managed, as to both course of study and finances, independently, by a faculty responsible solely to its own board of trustees. Because of the advance in medical education and the desire for true university control, the trustees of the Albany Medical College in 1915 appointed an executive committee of thirteen to control the educational policy of the medical school, eight members of which are governors of Union University. Also upon request of the trustees of the Medical College the governors of Union University have appointed a similar committee identical in personnel. The Treasurer of the Medical College has been appointed Treasurer of the University.

A complete reorganization of the school was effected in 1915. Largely increased hospital facilities have been assured, with teaching services in both medicine and surgery. The laboratory staff has been increased and the courses have been re-arranged to conform with improved methods. With these changes, the Albany Medical College is prepared to furnish instruction which meets the highest demands of modern medical education.

The executive faculty is composed of the chancellor of the university, the heads of the five major departments of medicine, two special departments and the dean.

The requirements for admission, promotion and graduation have been raised, and the classes are restricted in number so that the important personal relation between teacher and student may be maintained.

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AMASA J. PARKER	EDGAR S. BARNEY
J. TOWNSEND LANSING	COURTLAND V. ANABLE
FRANKLIN H. GIDDINGS	

FACULTY

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CHANCELLOR OF THE UNIVERSITY

JAMES PETER BOYD, M. D.
Emeritus Professor of Obstetrics and Diseases of Children

CYRUS STRONG MERRILL, M. D.
Emeritus Professor of Ophthalmology and Otology

Department of Medicine

HERMON CAMP GORDINIER, M. D., A. M.,
Professor of Medicine

THOMAS ORDWAY, M. D., A. M.
DEAN
Associate Professor of Medicine

ANDREW MacFARLANE, M. D.
Clinical Professor of Medicine

JESSE MONTGOMERY MOSHER, M. D.
Clinical Professor of Mental Diseases

LEO HAENDEL NEUMAN, M. D.
Clinical Professor of Gastro-Enteric Diseases

ARTHUR SAUTTER, M. D.
Clinical Professor of Dermatology and Contagious Diseases

HENRY LARNED KEITH SHAW, M. D.
Clinical Professor of Pediatrics

EDWARD WATERBURY BECKER, M. D.
Instructor in Medicine

HARRY WARDELL CAREY, M. D.
Instructor in Medicine

FREDERIC CHARLES CONWAY, M. D.
Instructor in Medicine

ERASTUS CORNING, M. D.
Instructor in Medicine

MALCOLM DOUGLAS, M. D.
Instructor in Medicine

NELSON KAUFMAN FROMM, M. D.
Instructor in Medicine

LEMUEL WHITTINGTON GORHAM, M. D.
Instructor in Medicine

CLARENCE FLACK GRAHAM, M. D.
Instructor in Medicine

CLINTON BENJAMIN HAWN, M. D.
Instructor in Medicine

WILLIAM KIRK, M. D.
Instructor in Medicine

SCHUYLER McCULLOCH MARTIN, M. D.
Instructor in Medicine

JOSEPH PATRICK O'BRIEN, M. D.
Instructor in Medicine

WILSON G. SMILLIE, M. D.
Instructor in Public Health

EDGAR ROSCOE STILLMAN, M. D.
Instructor in Medicine

FRANK VANDER BOGART, M. D.
Instructor in Pediatrics

JOSEPH ALOYSIUS LANAHAHAN, M. D.
Instructor in Dermatology

CHARLES KNICKERBACKER WINNE, JR., M. D.
Instructor in Medicine

LEROY SOLOMON BLATNER, D. D. S.
Assistant in Gastro-Enteric Diseases (Oral Pathology)

THEOBALD FREDERICK DOESCHER, M. D.
Assistant in Gastro-Enteric Diseases

RICHARD ANDREW LAWRENCE, M. D.
Assistant in Pediatrics

DANIEL VINCENT O'LEARY, M. D.
Assistant in Pediatrics

FRANK JOHN WILLIAMS, M. D.
Assistant in Pediatrics

Department of Surgery

ARTHUR WELLS ELTING, M. D., LL. D.
Professor of Surgery

ARTHUR JOSEPH BEDELL, M. D.
Clinical Professor of Ophthalmology and Otology

JOHN McWILLIAMS BERRY, M. D.
Clinical Professor of Orthopedics and Roentgenology

JOSEPH LEWI DONHAUSER, M. D.
Clinical Professor of Surgery

JOHN BRUCE HARVIE, M. D.
Clinical Professor of Surgery

CLEMENT FRANK THEISEN, M. D.
Clinical Professor of Laryngology and Rhinology

JAMES NEWELL VANDER VEER, M. D.
Clinical Professor of Genito-Urinary Surgery

GEORGE EVERETT BEILBY, M. D.
Instructor in Surgery

JOSEPH AMBROSE COX, M. D.
Instructor in Surgery

EDWIN LYON DRAPER, M. D.
Instructor in Surgery

EDWARD GERALD GRIFFIN, M. D.
Instructor in Surgery

PETER LYONS HARVIE, M. D.
Instructor in Surgery

EUGENE EUSON HINMAN, M. D.
Instructor in Laryngology and Rhinology

CHARLES HENRY MOORE, M. D.
Instructor in Ophthalmology and Otology

ARTHUR SAUTTER, M. D.
Instructor in Venereal Diseases

JOHN FORREST SOUTHWELL, M. D.
Instructor in Genito-Urinary Surgery and Surgical Pathology

ARTHUR HENRY STEIN, M. D.
Instructor in Surgery

JOHN EDWARD HESLIN, M. D.
Assistant in Genito-Urinary Surgery

WILLIAM PATRICK HOWARD, M. D.
Assistant in Orthopedics and Roentgenology

WILLIAM GEORGE KEENS, M. D.
Assistant in Laryngology and Rhinology

JOHN PAUL O'KEEFE, M. D.
Assistant in Laryngology and Rhinology

Department of Gynecology

JOHN ALBERTSON SAMPSON, M. D., A. M.
Professor of Gynecology

PAUL TOMPKINS HARPER, M. D.
Clinical Professor of Obstetrics

ROLAND G. HOLT, M. D.
Instructor in Obstetrics

TIFFANY LAWYER, M. D.
Instructor in Gynecology

JOSEPH HENRY BOWERS, M. D.
Assistant in Obstetrics

DARWIN ALFRED BRUCE, M. D.
Assistant in Obstetrics

WAKEMAN CLARK EGERTON, M. D.
Assistant in Obstetrics

GUY SWINBURNE HOUGHTON, M. D.
Assistant in Obstetrics

WILLIAM CARL RAUSCH, JR., M. D.
Assistant in Obstetrics

Department of Neurology

LaSALLE ARCHAMBAULT, M. D.
Professor of Neurology

NELSON KAUFMAN FROMM, M. D.
Instructor in Neurology

WILLIAM KIRK, M. D.
Instructor in Anatomy of the Nervous System

Department of Anatomy

WESLEY MANNING BALDWIN, M. D., A. M.
Professor of Anatomy

WALTER E. McCORKLE, PH. B., M. S.
Instructor in Anatomy

THOMAS WILLIAMS JENKINS, M. D.
Assistant in Anatomy

Department of Physiology

CHARLES M. GRUBER, PH. D.
Professor of Physiology

ARTHUR KNUDSON, PH. D.
Associate Professor of Biological Chemistry

_____, _____,
Instructor in Physiology

WILLIAM ATWOOD LARKIN, PH. G.
Secretary and Instructor in Biological Chemistry and
Pharmacology

ALBERT P. FELLOWS, D. D. S.
Assistant in Physiology

_____, _____,
Assistant in Pharmacology

Department of Pathology

ELLIS KELLERT, M. D.
Assistant Professor of Pathology

LAWRENCE JOSEPH EARLY, M. D.
Instructor in Pathology

STEPHEN HORACE CURTIS, M. D.
Assistant in Pathology

Special Lecturers and Instructors

A systematic and comprehensive course in Public Health, and subjects directly and indirectly related, has been arranged. This is made possible by the cordial co-operation of the numerous officials of the State Departments of Education, of Health, of Agriculture, of Labor, the City Department of Health, the Albany Law School and others eminent in special public health work or related fields. This course of lectures and demonstrations will form an integral part of the instruction of the fourth year students and most of these exercises will also be open to the public. The course will be held in the State Education Building each Wednesday at 5 P. M.

CALENDAR

1916

Regular winter session begins.....Monday, September 25
Election day — recess.....Tuesday, November 7
Thanksgiving — recess.....November 23, 24 and 25
Christmas vacation begins.....Saturday, December 23

1917

Lectures resumed.....Tuesday, January 3
Second semester begins.....Thursday, February 1
Washington's birthday — recess.....Thursday, February 22
Memorial day — recess.....Wednesday, May 30
Commencement.....Friday, June 8

REQUIREMENTS FOR ADMISSION

Each candidate for the Degree of Doctor of Medicine is required to present his medical student's certificate from the examinations division of the Board of Regents of the State of New York.

In addition to the regents' certificate the student is also required to show evidence of the *satisfactory* completion, in a recognized college or scientific school, of at least one year's course of study including French or German, biology, physics and chemistry, or an equivalent. Union College, the academic

department of Union University, Schenectady, N. Y., has arranged for such a course. These requirements are to be satisfied before matriculation. Deficiencies in single subjects may be made up prior to admission. The classes are limited in number and the College reserves the right in its discretion to refuse applicants, if the number admitted is as large as can be effectively taught. Students are requested to apply for admission before July 1 on blanks to be furnished by the Dean's office. All inquiries and other communications should be addressed to Thomas Ordway, M. D., Dean, Albany Medical College, Albany, N. Y.

Admission to Advanced Standing

All candidates for the Degree of Doctor of Medicine desiring to be admitted to advanced standing must satisfy the conditions referred to in the preceding paragraph, and in addition must present evidence that they have satisfactorily completed, at an approved medical school, the courses from which exemption is desired. They must also pass any examinations which may be deemed desirable by the heads of the several departments.

GENERAL PLAN OF INSTRUCTION

The first two years of the medical course are devoted mainly to the fundamental sciences, the larger part of the time being spent in practical work in the laboratories. The work of these years is on the so called "concentration plan" similar to that used at Harvard by which the student spends all day for the first half of the first year on gross and microscopic anatomy and embryology and in the second half of the first year the forenoons are devoted to physiology and the afternoons to biological chemistry. In a similar way pathology and bacteriology are studied in the first half of the second year. In the last half of the second year pharmacology, physical examination of normal infants, children and adults, certain phases of obstetrics, anatomy and special clinics are given in preparation for the clinical work of the last two years.

In the last half of the second year a course is given in laboratory instruction in methods and experience in the exam-

ination of water, milk, air and other matters pertaining to public health, including a sanitary survey. The field of public health is systematically covered in the fourth year by lectures and demonstrations by experts in association with the State Department of Health and City Bureau of Health and other specially invited lecturers and instructors.

In the last two years the various clinical branches are studied in the wards, hospitals, dispensaries and clinical laboratories. The third year is in part devoted to surgical pathology, clinical pathology, physical diagnosis of both medical and surgical conditions in the dispensaries and wards, and to general dispensary work. Didactic and clinical lectures in medicine are given during the third and fourth years as a basis for correlating and amplifying the information gained in the clinics and at the bed-side. In the third and fourth years also, the special branches of medicine are studied by small groups of students. In the fourth year similar groups have bed-side instruction and responsibility, under supervision, in surgery and medicine.

Examination and Advancement of Students

Students are divided into four classes or grades which are designated as first, second, third and fourth year, according to the time spent in study and the standing acquired. The passing mark is 75, 60 to 75 constitutes a "condition" and a mark below 60 constitutes a "failure." No student is eligible for re-examination in the Fall who is conditioned in more than two subjects except at the discretion the faculty. No student may be advanced to the work of the succeeding year with a condition in any subject after the fall examinations except at the discretion of the faculty. No student may be admitted to the third year class unless he has taken the preliminary New York State Board examinations. No student may be admitted to the fourth year class unless he has successfully passed the preliminary New York State Board examinations.

First Year Subjects. Gross Anatomy (including anatomy of the nervous system), Histology (exclusive of nervous system),

Embryology, Physiology, Organic Chemistry, Physiological Chemistry.

Second Year Subjects. Pathology (including parasitology), Pathology of the nervous system, Bacteriology, Pharmacology, Anatomy, Anatomy of the nervous system, Surgery, Obstetrics, Physical Diagnosis, Public Health (Hygiene), *Clinical Pathology.

Third Year Subjects. Medicine (including therapeutics and dietetics), Neurology, Pediatrics, Gastro-enteric diseases, Surgery (including surgical diagnosis, surgical technic and minor surgery), Orthopedics (including X-Ray), Genito-urinary surgery, Gynecology, Obstetrics, Surgical pathology, Ophthalmology and otology, Laryngology and Rhinology, Dermatology, Clinical Pathology.

Fourth Year Subjects. Medicine (including therapeutics, dietetics and pediatrics), Neurology, Gastro-enteric diseases, Surgery (including genito-urinary surgery and orthopedics and X-Ray), Mental diseases, Obstetrics (not including case work), Dermatology (not including section work), Gynecology (not including section work), Ophthalmology and Otology, Laryngology and Rhinology, Public Health (Hygiene).

The subjects of history of medicine, medical ethics, medical jurisprudence and economics are covered in the regular courses of study by several departments and by special lectures. The responsibilities of the physician towards the insane and their relatives and the general public, and the criminal aspects of the mentally defective, are discussed in the course in mental diseases and public health by Dr. Mosher, Mr. Hill and others. In the course on obstetrics Dr. Harper takes up the moral and legal side of rape, feigned and unconscious pregnancy, what constitutes a "live birth," feigned or unconscious delivery, injury to the foetus during precipitate labor, post mortem delivery and the diagnosis of recent delivery. Certain medico-legal aspects of toxicology are covered in the course in pharmacology. In the course in gross pathology, medico-legal autopsies and cases of homicide, suicide,

* Clinical Pathology will be begun during the session 1916-17 in the second half of the year.

accident and abortion and other phases of legal medicine are demonstrated or discussed.

Clinical Opportunities

Increased hospital facilities are assured in order to make sufficient clinical material available for approved methods of teaching clinical medicine.

Hospital Appointments

About the close of each school year vacancies occur in the house staffs of the hospitals in Albany, Troy and other cities. These are filled by medical school ranking or by competitive examinations which are open to members of the graduating class. Students are expected to take at least one year of service after graduation in a large general hospital. This year ninety-eight per cent. of the students in the graduating class obtained hospital appointments.

EXPENSES

The tuition fee is \$160.00 (one hundred sixty dollars) a year, payable in advance, or if desired, in two installments, the first on or before September 25, 1916, the second on or before January 31, 1917. The fee for dissecting material is \$15. There are no extra charges except for the rental of microscopes, laboratory breakage or loss and certain individual supplies for which a deposit of \$5 is required in each of the following courses: anatomy, physiology, biological chemistry, pharmacology and clinical pathology. All fees are payable at the Dean's office and are not returnable.

Every student is strongly urged to provide for himself a good compound microscope with oil-immersion lens. Such a microscope is not only necessary during the entire medical course but in actual practice after graduation. If a student is unable to secure such a microscope he may rent one, provided it is returned in good condition.

After the second year a standard blood counting apparatus, an instrument for hemoglobin estimation, a stethoscope and certain clinical supplies are recommended. For the laboratory work of the first two years, a dissecting set, slides, cover glasses and certain other inexpensive supplies are necessary. A list of these supplies, text and reference books will be given by the instructors at the first meeting of the courses.

Library

In 1893 the Medical School presented its library to the State of New York to form the nucleus of a large medical library which should be forever open to the students of the medical schools and in general to physicians throughout the State. The medical library is now unusually well housed and equipped in the new Education Building where every assistance and convenience is afforded to students. The entire library has 500,000 bound volumes and takes 8,800 current periodicals. The medical library possesses 19,000 bound volumes and receives 500 current periodicals. In addition to this library, each department has its own small working library of books and journals for ready reference.

DEPARTMENTS OF INSTRUCTION

The departments of instruction include the major branches of medicine and certain special subjects.

Anatomy

This department provides instruction in Histology, Embryology and Gross Anatomy. It co-operates with the departments of Surgery, Medicine and Neurology in the teaching of surgical, topographical and nervous anatomy respectively.

Anatomy. The work in this department is practical and the instruction personal. The various tissues and organs of the human body are studied synchronously, so far as is possible, in the subdivisions of embryology, microscopical anatomy, and gross anatomy in order that the student may acquire a more comprehensive view and better correlated knowledge of the subject.

The laboratories are equipped for research work along descriptive and experimental lines. Research workers who will give half or the whole of their day will be welcomed and granted every facility.

Gross Anatomy. This subject is taught almost entirely by the dissection of the human cadaver.

The required work upon each part comprises (a) a dissection

of the part, (b) a practical oral examination upon the completion of the part, (c) a written examination upon the completion of the part.

Microscopical Anatomy. Instruction in histology is given by means of lectures, demonstrations, class conferences, and practical work in the laboratory. The consideration of living and of fresh and unstained tissues precedes that of fixed and stained specimens. Practical instruction in the fixation, imbedding, cutting, and the vital-staining of tissues is given.

Embryology. Instruction in this subject is given by means of lectures, demonstrations upon models, class conferences, and laboratory work. The lectures cover the various features of mitosis, fertilization, cleavage, gastrulation, and the formation of the germ layers. Later, by coordination with the work in gross anatomy the various phenomena of histogenesis and of organogenesis are considered. The laboratory work consists of the study of stained serial sections and of the study of the larger embryological features by means of the binocular microscope.

Physiology

This department provides instruction in physiology, biological chemistry and pharmacology.

Physiology. The work in physiology is divided into laboratory work, lectures, recitations, special demonstrations, theses and written examinations. The course is given as far as possible in the form of laboratory work, and the laboratory has been recently equipped with new apparatus to accommodate forty students.

Biological Chemistry. The instruction in chemistry is arranged upon the assumption that the student is already thoroughly grounded in the principles of chemistry and physics. The object aimed at is to impart that fundamental knowledge of organic and physiological chemistry which is necessary to the comprehension of the bearings of chemistry upon physiology, pharma-

cology and medicine. The course is divided into two parts, organic and physiological chemistry.

Pharmacology. In this course, instruction is given by lectures, recitations, demonstrations and laboratory work. The first part of the work covers pharmacy and materia medica. The major part of the course covers experimental work illustrating the physiological action of a number of drugs.

Pathology

This department provides instruction in pathology, bacteriology, parasitology and certain phases of legal medicine.

The work in pathology and bacteriology is preceded by a brief explanatory talk, or followed by a lecture intended to correlate the various observations made during the day. The material received daily at the Bender Laboratory is used in the teaching and the student thus becomes familiar with laboratory routine. A small museum of gross pathological material is available and includes rare specimens. The autopsies performed during the course are viewed by small groups of men and the material carefully studied in gross and microscopically.

Medicine

This department provides instruction in internal medicine, physical diagnosis, pediatrics, dermatology, contagious, mental and gastro-enteric diseases, clinical pathology and public health.

Physical Diagnosis. Instruction in physical diagnosis is given to small groups. The section work in the last half of the second year includes the physical examination of normal infants, children and adults in preparation for the clinical work of the last two years. History taking is included in the course in physical diagnosis. In the third year, physical diagnosis is continued during the first semester. Various abnormal physical signs are studied as such and combined in relation to various diseases. For the course in physical diagnosis, the students examine one

another and material is also available in the general and special hospitals and dispensaries.

Internal Medicine. Instruction in internal medicine is given in the third and fourth years. In the third year the student is engaged in practical individual work in the general dispensaries. Systematic didactic and clinical lectures in medicine are given during the third and fourth years. In the fourth year the students serve as assistants in the medical wards.

In the third year didactic or clinical lectures are given. Special lectures on therapeutics are given once a week during the last half of the year.

In the fourth year, students are required to take at least three months medicine (4 hours a day) as assistants in the wards of the Samaritan Hospital, St. Peter's Hospital, the Albany Hospital and its tuberculosis department under direction. In this year clinics and clinical or didactic lectures are given.

Pediatrics. The course of study in children's diseases consists of didactic lectures; study of clinical cases in small groups; laboratory work; examination of milk, stools, etc.; study of case histories; recitations and practical work in connection with the infant welfare station.

The cities of Albany and Troy offer numerous opportunities for students for the study of diseases of children and infants, and also facilities to observe the medical inspection of school children and the operation of infant welfare stations.

Dermatology and Contagious Diseases. In the third year clinics and clinical lectures are given twice weekly at St. Peter's Hospital, and in the fourth year section work is given to groups of students three hours each week.

Didactic lectures in contagious diseases are given for the most part in the course in pediatrics. The practical individual instruction in contagious diseases is given in small sections during the third and fourth years.

Mental Diseases. Instruction is given to the senior class divided into sections. A syllabus in the form of a notebook with short

psychological introduction is used as a guide. Opportunity is given to observe the progress of different cases from week to week.

Gastro-Enteric Diseases. The student is prepared for the course in digestive diseases by training in physiology and physiological chemistry. The third year course includes clinical lectures, demonstrations and recitations. A systematic course in digestive diseases is given to this class. The fourth year is mainly clinical.

Clinical Pathology. In this course a systematic study of the methods for examination of urine, blood, sputum, stomach contents, stool and body fluids is undertaken. Instruction is given by means of work in the laboratory, supplemented by brief lectures and outside reading.

Public Health. In the last half of the second year a course is given in laboratory instruction in methods and experience in the examination of water, milk, air and other matters pertaining to public health, including sanitary surveys.

The field work includes both a sanitary survey of a given district by groups of students under direction and an insight into the practical workings of the state laboratory for the production of antitoxin, vaccine, etc., of the city filtration plant and of the city health inspection, for the collection of milk samples, the suppression of nuisances, etc.

In the fourth year, a systematic and comprehensive course in public health and subjects directly and indirectly related, such as medical jurisprudence, sex hygiene, social service, etc., has been arranged.

Surgery

This department provides instruction in surgery, surgical pathology, orthopedics, roentgenology, genito-urinary surgery, ophthalmology, otology and diseases of the nose and throat.

Surgery. In the third year instruction is given in surgical pathology, surgical diagnosis, surgical technique, and section work in surgical dispensaries.

In the fourth year bed-side teaching is done, in which the senior students, in small groups, serve as assistants in the wards at the hospitals. Surgical clinics and recitations in surgery are also held.

Surgical Pathology and Surgical Diagnosis. Surgical pathology is taught throughout the third year. The essentials of histology and pathology and their relation to surgery are discussed before starting on general and special surgical pathology.

Surgical diagnosis is also given during the third year, and surgical history taking is one of the main topics of the course.

Surgical Technique and Minor Surgery. The course in surgical technic and minor surgery consists as far as possible of practical demonstrations, preceded by a brief synopsis of the development of modern surgical technic. Practical work is required of each student.

Orthopedics and Roentgenology. The course in orthopedic surgery is given in the wards of the Albany Hospital and the Child's Hospital.

For the course in roentgenology the Albany Medical College has at its disposal the Roentgen ray department of the Albany Hospital.

Genito-Urinary Surgery. In the fourth year instruction is given by section teaching in small groups by lectures, lantern slide demonstrations and clinics. The students have practical individual experience in the treatment of cases.

Ophthalmology and Otology. In the third year one lecture a week in ophthalmology is given for the first half of the year and a corresponding hour in the last half of the year is devoted to otology. The didactic work is illustrated by specimens and lantern demonstrations.

In the fourth year the class is divided into sections. Each student has one period a week for the entire year. Clinical lectures illustrate the methods of examining the patient, the external diseases of the eye, the use of the ophthalmoscope and its practical application, operations and general ophthalmology.

The student is taught the method of examining and treating the common ear diseases and is shown the ordinary and also the complicated ear operations, including personal instruction with patients.

Laryngology and Rhinology. In the fourth year one and a half hours a week will be devoted to teaching diseases of the nose and throat. This includes clinical lectures, section teaching and special methods of diagnosis.

Neurology

This department provides instruction in neurology, neuropathology and the anatomy of the nervous system.

Cases for neurological clinics are always easily obtained either from the general medical service and out-patient department of the Albany City Hospital, St. Peter's Hospital and the Child's Hospital, or from the Alms House and County Hospital. Occasionally, a clinic hour is utilized for a lantern slide demonstration of neurological conditions not encountered in the usual clinical display, there being for this purpose an exceptionally varied and interesting collection of pictures derived from the leading neurological clinics of Europe.

Gynecology

This department provides instruction in gynecology and obstetrics.

Gynecology. Gynecology is treated by a course of class room studies in which the various normal and abnormal conditions of the pelvic organs are presented to the students in the form of illustrated problems which they are asked to solve. The solution of these problems is supplemented by additional information necessary to complete the subject under discussion.

Obstetrics. Material for instruction is furnished by the Anthony N. Brady Maternity Home, the Albany Hospital and the Albany Guild for the Care of the Sick.

Investigation and Special Instruction

Opportunity for elective work and research is offered to those who are deemed qualified by those in charge of the various courses after conference with the heads of their respective departments. For graduate and summer courses and other special instructions, application should be made to the dean.

Course for Health Officers

The Albany Medical College offers an intensive course for Health Officers during the last half of the school year. This course combines field and laboratory work.

ALBANY LAW SCHOOL

This school is among the oldest institutions of the kind in the country, having been established in 1851, and its graduates number many of the most successful men in the profession. It is and has been largely represented in the executive, judicial and legislative departments of this and many other states, as well as of the federal government. It became a part of Union University in 1873, and begins its sixty-fourth year as a law school with the present scholastic year. During its long and successful career it has, in common with other law schools, done much to demonstrate what was at one time doubtful, but is now accepted almost as an axiom, that a course at the law school is a well-nigh necessary prerequisite to a successful professional career. Its instructors have always been men of repute and standing, both for professional learning and personal character.

The local advantages of the city of Albany, as the seat of a professional school, can not be overrated. It is the capital of one of the leading states in the Union, whose legislature is in session here for the third part of the year, presenting opportunities not afforded by any other law school in the state for observing the methods and procedure collectively of the executive, judicial and legislative departments of the state government. The knowledge thus obtained by the students at law, who are to complete their course and to enter the realm of public affairs, can not be overestimated. It is easily accessible, remarkably healthful, and the scene of great business and professional activity.

The facilities afforded the students for reading and study are unsurpassed. Besides the convenient and well chosen library of the school accessible to the students at all hours of the day and evening, the students have the privilege of using the state law library, which is now established in the New Education Building. With free access to these libraries the student may be relieved to a great extent from purchasing text-books.

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Torts, Practice Court

Hubbard Chair of Legal Ethics

The circulars of seventy of the leading law schools of the country show that a very few years ago only twenty of this number made the subject of legal ethics part of the curriculum. With two exceptions, those schools were either in the west or south. These facts led Gen. Thos. H. Hubbard, class of '60, to place at the disposal of the board of trustees the sum of \$10,000, the income to be applied to lectures upon this subject. The board of trustees decided to inaugurate the course at the opening of the school year of 1903 and twenty-six Lectures by as many distinguished judges and lawyers have been delivered up to this time.

CALENDAR

1916

Registration, first semester.....Monday, September 18
 Scholastic year begins.....Tuesday, September 19
 Election day recess begins.....Friday, November 3
 Lectures resumed.....Wednesday, November 8
 Thanksgiving recess begins, noon.....Thursday, November 23
 Lectures resumed.....Thursday, November 28
 Holiday recess begins, noon.....Friday, December 22

1917

Lectures resumed.....	Wednesday, January 3
Examinations....	Thursday, Friday and Saturday, January 25-27
McKinley day — recess.....	Monday, January 29
Registration, second semester.....	Tuesday, January 30
Lincoln's birthday — recess.....	Monday, February 12
Washington's birthday — recess.....	Thursday, February 22
Easter recess begins, noon.....	Friday, April 6
Lectures resumed.....	Monday, April 16
Memorial day — recess.....	Wednesday, May 30
Examinations....	Thursday, Friday and Saturday, May 31-June 2
Commencement.....	Thursday, June 7

REQUIREMENTS FOR ADMISSION AND GRADUATION

The course for graduation is now three years. Candidates for graduation from this school will be required (1) to present evidence of a general preliminary education representing at least four years, or their equivalent, of work of a grade above the elementary or grammar school before beginning the course of study; (2) to have studied law at least three full years for the degree of LL. B., each school year of which shall consist of not less than thirty-two school weeks, exclusive of vacations, in which not less than ten hours of attendance upon law lectures or recitations of such prescribed course to be given or conducted by regular members of the faculty are required in each week, unless admitted to advanced standing of one year on graduation from a registered college or university; (3) to complete the course in residence of not less than one year; (4) to be of good moral character; (5) to be at least twenty-one years of age.

EXPENSES

Matriculation fee, on entrance.....	\$10
Tuition, each year.....	120
Graduation fee	10

For catalogues or further information address

JOHN C. WATSON, *Registrar*

Albany Law School,

Albany, N. Y.

THE DUDLEY OBSERVATORY

The Dudley Observatory is devoted to original research in astronomy, according to the purpose of its founder and successive patrons. Its contributions to science are represented in two volumes of *Annals* and in other published volumes and memoirs contained in the transactions of learned societies and astronomical journals. Its principal line of work at present is the determination of problems relating to the positions and motions of the stars and of the solar system as a whole.

The instrumental equipment of the observatory is designed for the purposes of exact measurement. In the tower of the main building is the Pruyn equatorial, with object-glass twelve inches in diameter. This instrument is equipped for both visual and photographic use, and is of a high order of mechanical perfection. The Olcott meridian circle is located in a separate building, especially designed for securing the utmost equality in the temperature between the external air and that in the building itself. Its object-glass is eight inches in diameter. It was made by Pistor and Martins, of Berlin, and is regarded by astronomers as a masterpiece of accurate workmanship. This instrument has been employed for many years in obtaining the measurements necessary for the construction of the numerous and elaborate star catalogues which have issued from the Dudley Observatory. In addition to these instruments, the observatory is in possession of various small telescopes, clocks, chronographs and smaller apparatus.

The institution is supported by an endowment, chiefly contributed by Mrs. Blandina Dudley, the late Catharine W. Bruce, and Hon. Frederic P. Olcott, as well as by appropriations which have been received from the National Academy of Sciences, and from current contributions of trustees and friends of the institution. Since 1902, annual grants have been made to the director of the observatory by the Carnegie Institution of Washington. These have been sufficient to provide for the entire force of assistants and computers now employed. In 1905, the Carnegie Institution made

special provision for carrying on the star researches upon which the observatory is engaged. This includes an appropriation which enabled the observatory to send the Olcott meridian circle to the southern hemisphere for two years with an ample force of observers, in order to carry out an essential feature of its investigations.

The Dudley Observatory is not designed to give general instruction in astronomy, though special students contemplating instruction in professional lines are received under an arrangement of computing service to the observatory.

The observatory is opened to visitors on Tuesday evening.

For further particulars apply to

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ALBANY COLLEGE OF PHARMACY

The Albany College of Pharmacy was created by act of the board of governors of Union University, June 21, 1881, and constitutes the department of pharmacy of Union University. It was incorporated as the Albany College of Pharmacy, August 27, 1881. The college is centrally located at 43-45 Eagle street.

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Assistant in Microscopical Laboratory

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Instructor in Pharmacy and Mathematics

LE ROY GEORGE MATHEWS, PH. G.

Instructor in Physics

CLARENCE EDMOND MULLENS, M. D.

Lecturer in Physiology

CLARENCE EDWARD OSTRANDER, PH. G.

Instructor in Pharmacy and Chemistry

CALENDAR FOR 1916-1917

1916

Opening exercises.....Monday, September 25
Conditions examinations begin.....Friday, September 22
Christmas vacation, begins.....Monday, December 25

1917

Exercises resumed.....Monday, January 8
Commencement.....Tuesday, May 1

REQUIREMENTS FOR ADMISSION

All applicants for admission to regular standing in this college must be at least seventeen years of age, and will be required to present a Pharmacy Student Certificate issued by the New York State Education Department. The requirement for this certificate is the completion of the first year's course in a recognized high school or academy, or evidence of an equivalent education. Inquiries concerning this preliminary requirement may be addressed to the New York State Education Department, Albany, New York.

CURRICULUM

The curriculum of the college embraces:

Chemistry—Theoretical, general, pharmaceutical and analytical

Botany—Structural, systematic and analytical

Materia Medica and Pharmacognosy

Pharmacy—Theoretical and Practical

Microscopy—Theoretical and practical in its relation to pharmacy

Toxicology

Pharmaceutical Mathematics

Physics

Physiology

Latin

Pharmaceutical Jurisprudence

Commercial Pharmacy

GRADUATION

The diploma of this college confers the degree of Graduate in Pharmacy (Ph. G.). Applicants for this degree must have had the required preliminary education, be of good moral character, have attended two full courses in this college, or the last course in this college and the first in some other registered college of pharmacy; have passed satisfactory examinations and paid all fees as hereafter stated.

FEES FOR TUITION

EACH YEAR	
Matriculation	\$5 00
Tuition	95 00

SITUATIONS

Students desirous of obtaining employment while attending college will be assisted as far as possible in securing situations, but employment cannot be promised in advance, and places cannot be secured by correspondence. Personal application for employment always brings the best results. During the past several years the faculty has had a much larger number of openings offered for graduates to lucrative positions than it has been able to fill. The demand on the part of the employers for skilled assistants is steadily increasing, and a college diploma or license from an examining board is demanded by law of those who engage in the practice of pharmacy in most of the states and cities of the Union.

For separate catalogue giving more complete information address

ALFRED B. HUESTED, *Secretary*
43-45 Eagle street
Albany, N. Y.

ENROLLMENT, UNION UNIVERSITY, 1916-17

STUDENTS OF UNION COLLEGE

Abbreviations

cl, A. B. course; *ls*, Ph. B. course; *sc*, B. S. course; *en*, B. E. underclass course in general engineering; *ce*, B. E. course in civil engineering; *ee*, B. E. course in electrical engineering; N. S., North Section; M. S., Middle Section; S. S., South Section; N. C., North College; S. C., South College; O. G., "Old Gym" Dormitory.

An asterisk (*) before a student's name indicates that he has not been advanced in standing with his class.

Candidates for the Degree of Master of Arts or Master of Science

Roy E. Abbey, B. S.....	<i>Schenectady</i>
Michael William Bray, A. B.....	<i>Utica</i>
Harry L. Bain, A.B.....	<i>Troy</i>
Harold E. Blodgett, Ph. B.....	<i>Schenectady</i>
Harry Lee Davenport, B. S.....	<i>Schenectady</i>
George M. Elmendorf, Ph. B.....	<i>Herkimer</i>
David Roy Finley, A. B.....	<i>Schenectady</i>
Paul J. Hagar, A. B.....	<i>Jersey City, N. J.</i>
William A. Hughes, B. S.....	<i>Schenectady</i>
Edward B. Irish, A. B.....	<i>Fultonville</i>
Arthur L. Maxon, A. B.....	<i>Schenectady</i>
Roy H. McCormack, A. B.....	<i>Cincinnati</i>
Fred F. McGauley, B. S.....	<i>Schenectady</i>
Floyd Leslie Miller, Ph. B.....	<i>Schenectady</i>
James H. Potter, A. B.....	<i>Cambridge, Mass.</i>
Frank Stanley Randles, B. S.....	<i>Haverford, Pa.</i>
Ross Williams Tiffany, B. S.....	<i>Newburgh</i>

Harry G. Van Deusen, A. B.....	<i>Sayre, Pa.</i>
Charles N. Waldron, B. S.....	<i>Schenectady</i>
Kenneth B. Walser, A. B.....	<i>New York City</i>
Roy Cameron Whitney, B.S.....	<i>Schenectady</i>

Candidates for the Degree of Master of Civil Engineering

Harold W. Baker, B. E.....	<i>Rochester</i>
Tulloch McC. Townsend, B. E.....	<i>Schenectady</i>

Graduate Students in Civil Engineering

Ying-chiun Lo, M. E.....	<i>Cornell University</i>China
Jee Kwun Wong.	<i>University of Missouri</i>	China

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Ernst F. W. Alexanderson, M. E...	<i>Royal Tech. Inst.</i>	Sweden
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Louis DuB. De La Vergne, M.S. in E.E.	<i>Union College</i>	Kingston
Candidate for the degree of Doctor of Philosophy		
Olin J. Ferguson, M. E. E.....	<i>Univ. of Nebraska</i> ..	Lincoln, Neb.
Candidate for the degree of Doctor of Philosophy		
Wilbert A. Garrison, A. M.....	<i>Harvard University</i> ..	Schenectady
Candidate for the degree of Doctor of Philosophy		
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Alex. R. Stevenson, Jr., M. S. in E. E.	<i>Princeton University</i> .	Schenectady
Candidate for the degree of Doctor of Philosophy		
Walter L. Upson, M. E. E.....	<i>Princeton University</i> .	Schenectady
Candidate for the degree of Doctor of Philosophy		
John N. Vedder, A. M., M. E.	<i>Union College</i>	Schenectady
Candidate for the degree of Doctor of Philosophy		
P. Arnold Anderson, B. S.....	<i>Univ. of California</i> ...	Schenectady
Candidate for the degree of Master of Science in Electrical Engineering		

- Manuel Wenceslao Dans, B. S.....*Clarkson Poly. Inst...*Schenectady
Candidate for the degree of Master of Science in Electrical Engineering
- Delwyn Dessar, B. S.....*Univ. of Nevada....*Schenectady
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- Julius J. Hoerath, B. E. E.....*Ohio State University*.Schenectady
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- Willis Fenton Hudson, B. S.....*Iowa State College...*Schenectady
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- Reid Huntington, B. S.....*Wash'ton State Col..*Schenectady
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- Harold Leonard, B. S.....*Worcester Pol. Inst..*Schenectady
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- Robert W. Wieseman, E. E.....*Lehigh University....*Schenectady
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sc Kenneth Elwood Baird.....*Schenectady*.....177 Furman St.
cl Allison Susholz Behr.....*Amsterdam*...32 No. Wendell Ave.
sc Albert Ralph Boomhower.....*Plattsburg*.....Ψ Τ House
ce Edward Carpenter Brandow....*Albany*.....Δ Τ House
sc Irwin Alfred Buell.....*Northampton*.....Silliman Hall
ee Clarence Jerome Bull.....*Mamaroneck*.....Ψ Τ House
ce Justin William Carr.....*Astoria*.....K A Lodge
cl David Ferdinand Chapman....*Broadalbin*.....Δ Φ House
ee Robert Henry Clapp.....*Fairport*.....739 Nott St.
 **sc* Arnold Vincent Cleary.....*Easthampton, Mass.*Pyramid Club
sc Isaac William Clements.....*Fort Ann*.....Pyramid Club
cl Wilson Ober Clough.....*Schenectady*.....Silliman Hall
ce Stephen Joseph Costello.....*Schenectady*.....706 South Ave.
ee Harry Hurlbut Dibble.....*Ushers*.....Pyramid Club
sc Philip Windsor Downs.....*Omaha, Neb*.....X Ψ Lodge
ee Floyd Field Eldred.....*Auburn*.....Ψ Τ House
sc Frank Russell Elmore.....*Middletown*.....B Θ Π House
 **ee* Anson Ainsworth Emmerling...*Albany*.....Φ Γ Δ House
 **ce* James Harold England.....*Albany*.....25 Kent St., Albany
ee Christopher Canning Farrell...*Arlington, R. I.*...Pyramid Club
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ls Jacob William Gauger.....*Albany*.....Δ Φ House
ls William Morris Gilbert, Jr.....*Yonkers*.....Ψ Τ House
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cl Arthur Clifford K. Hallock....*Schenectady*.....6 Gillespie St.
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sc	Earl Myron Hyatt.....	Newburgh.....	161½	Nott Terrace
ls	John Hulbert Imrie.....	Lake George.....	Δ Φ	House
ls	John Wagner Jackson.....	Fort Plain.....	Albany Medical College	
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ce	Herman Lynn Kertscher.....	Elmira.....	Ψ T	House
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*sc	Charles Albert Lewis.....	Troy.....	I No.	Church St.
ce	William Cahill Loughlin.....	Fort Edward.....	Φ Γ Δ	House
ee	Rufus Victor Maier.....	Schenectady.....	1318	State St.
sc	Ernest Wyckoff Mandeville....	Elmira.....	Ψ T	House
sc	Louis Mann.....	New York City.....	Δ T	House
ce	Allen Mattison.....	South Berlin.....	Δ X A	House
sc	John Francis McDermott.....	Schenectady.....	129	Park Pl.
ce	Ashley Clinton Mead.....	Scotia....	22	Ballston Ave., Scotia
ce	James Floyd Miller.....	Albany.....	B Θ Π	House
sc	Ralph Gleason Morison.....	Little Britain.....	Φ Δ Θ	House
ee	Raymond Everett Moses.....	Brackney, Pa.....	22	Barrett St.
ee	George Eldred Moston.....	North Creek.....	Φ Δ Θ	House
ee	Armando da Souza Mursa.....	Sao Paulo, Brazil.....	N. S. S. C.	
ce	Gordon Clifford Nash.....	Mt. Kisco.....	S. S. N. C.	
ee	Milton McCowan Newell.....	El Paso, Texas....	862	Union St.
ee	Tsu Shou Ouyang.....	Nanchang, China...	408	Union St.
sc	Fawcett William Porter.....	Omaha, Neb.....	X Ψ	Lodge
ce	Don P. Price.....	Hancock.....	238	Green St.
ce	Herbert Spencer Roberts.....	Scotia....	38	Ballston Ave., Scotia
ee	Thomas Carter Rogers.....	Atlanta, Ga.....	4	Nott Terrace
sc	Dow Geesler Roof.....	Canastota.....	Φ Γ Δ	House
ce	Wilfred Masten Rosekrans....	Schenectady.....	Φ Δ Θ	House
ls	Albert Salisbury.....	Deposit.....	27	Waverly Pl.
sc	Harold Leonard Sammons.....	Ogdensburg.....	B Θ Π	House
ee	William Schauer.....	Altoona, Pa....	530	Christler Ave.

<i>ee</i>	James McPherson Schmidt.....	<i>Hurley</i>	11 No. Wendell Ave.
<i>ls</i>	Rudolph William Schwartz.....	<i>Albany</i>	37 Glenwood Blvd.
<i>ce</i>	Hal Arch Scoby.....	<i>North Tonawanda</i> ..	B Θ II House
<i>ce</i>	Tracy Hazard Sherman.....	<i>Nyack</i>	N. S. N. C.
<i>sc</i>	Homer L. Stephens.....	<i>Gardner</i> ..	Albany Medical College
<i>ce</i>	Glenn Ridgeway Stevens.....	<i>Newark</i>	B O II House
<i>sc</i>	Guy Joseph Tanzer.....	<i>Amsterdam</i>	Pyramid Club
<i>cl</i>	John Hider Tregurtha.....	<i>Schenectady</i> ...	37 Parkwood Blvd.
<i>ee</i>	John Winters Upp, Jr.....	<i>Schenectady</i>	40 Wendell Ave.
<i>sc</i>	Forest Baldwin Van Avery.....	<i>Schenectady</i>	3 Haigh Ave.
<i>*ee</i>	Edward Clifford Vrooman.....	<i>Schenectady</i>	207 Union St.
<i>sc</i>	George Hugh Wallace.....	<i>Port Jefferson</i>	Pyramid Club
<i>ce</i>	Leon J. Walrath.....	<i>St. Johnsville</i>	Δ T House
<i>ce</i>	Arnold Noble Weeks.....	<i>Ticonderoga</i>	Φ Γ Δ House
<i>ce</i>	Samuel Noble Wheeler, Jr.....	<i>Hancock</i>	S. S. N. C.
<i>sc</i>	Hugh J. Williams.....	<i>Elmhurst, Pa.</i>	Δ X A House
<i>ce</i>	Andrew Douglas Wilson.....	<i>Schenectady</i>	321 Crane St.

Seniors — 92

Juniors, Class of 1918

<i>*ee</i>	James Nelson Aken.....	<i>Philmont</i>	Δ T House
<i>sc</i>	Benton Fremont Allen.....	<i>Lowville</i>	711 Nott St.
<i>ee</i>	Harley Frank Atwood.....	<i>Glens Falls</i>	Δ Φ House
<i>cl</i>	Frederick George Bascom.....	<i>Fort Edward</i>	K A Lodge
<i>*sc</i>	John J. Beattie.....	<i>Salem</i>	Δ Φ House
<i>sc</i>	Guy Hamilton Beckett.....	<i>Omaha, Neb.</i>	X Ψ Lodge
<i>sc</i>	John Frederick Behnken.....	<i>Jeffersonville</i>	Pyramid Club
<i>ee</i>	William Thomas Birdsall.....	<i>Walden</i>	Φ Δ Θ House
<i>*ee</i>	Aurelio Laurinto Borelli.....	<i>Campinas, Brazil</i>	N. S. S. C.
<i>*ce</i>	Charles Harkness Bowman.....	<i>Pittston, Pa.</i>	A Δ Φ House
<i>*ce</i>	Charles Seymour Brignall.....	<i>Schenectady</i>	1309 Union St.
<i>sc</i>	Almond Crandall Brockway....	<i>Richfield Springs</i>	Δ T House
<i>ee</i>	John David Brown.....	<i>Bridgeport, Conn.</i>	K A Lodge
<i>cl</i>	L. Prescott Brown.....	<i>Mt. Kisco</i>	K A Lodge
<i>*sc</i>	Harry Ames Calkins.....	<i>Cohoes</i>	B Θ II House
<i>cl</i>	Edward Madison Cameron, Jr..	<i>Albany</i>	Δ Φ House
<i>ee</i>	Willis Robert Cantrell.....	<i>New York City</i> ..	208 Van Vran. Av.
<i>sc</i>	W. Gibson Carey, Jr.....	<i>Schenectady</i>	A Δ Φ House

<i>ee</i>	Dean David Chapleau.....	<i>Ticonderoga</i>	Pyramid Club
<i>ee</i>	Henry Anable Clarke.....	<i>Williamsport, Pa.</i>	K A Lodge
<i>ee</i>	Ralph Sebring Clark.....	<i>Kalamazoo, Mich.</i>	Δ Φ House
<i>cl</i>	Harold Lewis Cook.....	<i>Auburn</i>	Ψ Υ House
<i>ee</i>	Irving Maxwell Day.....	<i>Schenectady</i>	26 Rugby Rd.
<i>ce</i>	Philip Smith Dorlon, Jr.....	<i>Troy</i>	Δ Φ House
<i>cl</i>	Harold Leo Dunn.....	<i>Schenectady</i>	B Θ Π House
<i>cl</i>	Spencer Brownell Eddy.....	<i>Saratoga</i>	A Δ Φ House
* <i>ce</i>	Wendell John Erickson.....	<i>Schenectady</i>	7 Columbia St.
<i>ce</i>	George Harold Fancher.....	<i>Schenectady</i>	32 Washington Ave.
<i>ce</i>	Fred William Fisch.....	<i>Schenectady</i>	112 Van Vran. Ave.
<i>ce</i>	Lewis Milmine Fox.....	<i>Schenectady</i>	115 Irving St.
<i>ce</i>	Leonard Harrison Frasier.....	<i>Amsterdam</i>	Φ Γ Δ House
* <i>ce</i>	Lloyd John Friday.....	<i>Schenectady</i>	25 Parkwood Blvd.
<i>ce</i>	David Gardenier	<i>Chatham</i>	Δ Υ House
<i>ce</i>	Bruce Alexander Hainsworth..	<i>Gloversville</i>	1103 Nott St.
<i>ee</i>	Benjamin Frank Hance.....	<i>Fairport</i>	157 Nott Terrace
<i>ee</i>	Harold Asahel Hawley.....	<i>Waterford</i>	Σ Φ Place
<i>ee</i>	Harold Harvey Hay.....	<i>Holyoke</i>	817 State St.
<i>cl</i>	Clyde Alexander Heatly.....	<i>Schenectady</i>	20 Waverly Pl.
<i>sc</i>	Pierre Hoag	<i>Schenectady</i>	Σ Φ Place
<i>sc</i>	Walter Hochuli	<i>Schenectady</i>	1471 State St.
<i>ee</i>	Elmer Newton Howard.....	<i>E. Northfield, Mass.</i>	Pyramid Club
<i>ee</i>	James Edwin Hulshizer, Jr....	<i>Bernardsville, N. J.</i>	X Ψ Lodge
<i>ee</i>	Harold Forbell Hyatt.....	<i>Jamaica</i>	Ψ Υ House
<i>ee</i>	Herbert Leigh Jaycox.....	<i>Beacon</i>	Φ Γ Δ House
<i>sc</i>	August John, Jr.....	<i>Schenectady</i>	113 So. Ferry St.
<i>cl</i>	Wesley Decius Karker.....	<i>Schenectady</i>	1216 Albany St.
<i>cl</i>	William Logan Kennedy, Jr....	<i>New York City</i>	Δ Υ House
<i>cl</i>	Marvin Irving King.....	<i>Schenectady</i>	237 Union St.
<i>sc</i>	Clarence Henry Krusie.....	<i>Schenectady</i>	209 Avenue A
<i>sc</i>	Louis Albert Lagnette.....	<i>New York City</i>	K A Lodge
<i>ee</i>	Frank Alexander Laskowski....	<i>Schenectady</i>	342 Bridge St.
<i>ee</i>	Ko Gyee Leong.....	<i>Rangoon, Burma, Ind.</i>	105 Sew. Pl.
* <i>sc</i>	Bernadotte Perrin Lester.....	<i>Saratoga</i>	A Δ Φ House
<i>ee</i>	Thomas Leo Madden.....	<i>Clyde</i>	70 Bedford Rd.
<i>ee</i>	William Herman Matern.....	<i>Gloversville</i>	North Colonnade
<i>cl</i>	Jasper Ernest McIntyre.....	<i>W. Albany</i> ..	Stop 20½ Albany Rd.

<i>ls</i>	Traver McKenna	<i>Albany</i>	Δ X A House
<i>ee</i>	Mark Felton McLean.....	<i>Jamaica, Vt.</i>	Pyramid Club
<i>*ce</i>	Harold Allen Mills.....	<i>Gloversville</i>	Δ X A House
<i>ee</i>	John Morton Moore.....	<i>Northville</i>	20 Church St.
<i>ee</i>	Mantin Edward Morris.....	<i>Schenectady</i>	47 Glenwood Blvd.
<i>sc</i>	George Franklin Mosher.....	<i>Northville</i>	32 Waverly Pl.
<i>sc</i>	Frank D. Moynihan.....	<i>Fort Edward</i>	11 Barrett St.
<i>sc</i>	James Bragdon Mudge.....	<i>Schenectady</i>	233 Liberty St.
<i>ee</i>	Earl Lester Newell.....	<i>East Aurora</i>	B Θ Π House
<i>ce</i>	Arthur Hempstead Newman....	<i>Bridge Hampton</i>	Φ Γ Δ House
<i>sc</i>	Theodore de Cou Palmer, Jr....	<i>Syracuse</i>	A Δ Φ House
<i>ee</i>	Hall Brainard D. Passage.....	<i>Schenectady</i>	244 McClelland St.
<i>ee</i>	James Frank Peaslee.....	<i>East Springfield</i>	Φ Δ Θ House
<i>cl</i>	Mathias Philip Poersch.....	<i>Schenectady</i>	867 Stanley St.
<i>ce</i>	Herbert Edward Rankin.....	<i>Albany</i>	Cherry Hill, Albany
<i>ee</i>	Andrew Kidd Reid.....	<i>Schenectady</i>	30 Wendell Ave.
<i>ce</i>	Harold Percival Rounds.....	<i>Dexter</i>	Pyramid Club
<i>ee</i>	Edwin Augustus Schabbehar....	<i>Rockville Centre</i> ...	Δ X A House
<i>sc</i>	Hyman W. Sevits.....	<i>Schenectady</i>	606 Terrace Pl.
<i>*ee</i>	James Kyle Sexson.....	<i>Franklin, Neb.</i>	Pyramid Club
<i>*ls</i>	Francis Leatham Skau.....	<i>Schenectady</i>	O. G.
<i>ce</i>	Ernest Randolph Slade.....	<i>Gloversville</i>	North Colonnade
<i>cl</i>	Leo Henry Smith.....	<i>Warrensburgh</i>	20 Barrett St.
<i>ee</i>	Louie Spraragen	<i>Warwick</i>	N. S. S. C.
<i>cl</i>	Ignatz Russell Stein.....	<i>Schenectady</i>	38 Glenwood Blvd.
<i>*sc</i>	John Barnaby Still.....	<i>Brooklyn, Pa.</i>	S. S. N. C.
<i>ce</i>	Kenneth William Stillman.....	<i>Argyle</i>	Pyramid Club
<i>ee</i>	Fred Leland Kasson Swart....	<i>Auburn</i>	1007 Nott St.
<i>sc</i>	Sidney Wells Talbot.....	<i>Schenectady</i>	Ψ T House
<i>sc</i>	John Arthur Taylor.....	<i>Schenectady</i>	216 Van Vran. Av.
<i>ee</i>	Francis Marshall Terry.....	<i>Little Falls</i>	1003 Nott St.
<i>sc</i>	Hunter Adaline Towne.....	<i>Duluth, Minn.</i>	Δ Φ House
<i>ls</i>	Ralph Sylvester Travis.....	<i>Hale Eddy</i>	Pyramid Club
<i>ee</i>	Cecil Harley Underwood.....	<i>Schenectady</i>	202 Wright Ave.
<i>ee</i>	Leslie Samuel Uphoff.....	<i>Schenectady</i>	120 Avenue B
<i>cl</i>	Beverly Leland Vosburgh.....	<i>Johnstown</i>	9 State St.
<i>cl</i>	John Charles Younie.....	<i>Schenectady</i>	26 Nott Terrace
<i>*ce</i>	Max Zuckerman	<i>Gloversville</i>	S. S. S. C.

Sophomores, Class of 1919

<i>sc</i>	Walter Livingston Alexander..	<i>Schenectady</i>	308 Summit Ave.
<i>sc</i>	Harold Randolph Baird.....	<i>Amsterdam</i>	Φ Γ Δ House
<i>en</i>	William Russell Barnett.....	<i>Newburgh</i>	Φ Γ Δ House
<i>en</i>	Charles Edgar Barrett.....	<i>Galway</i>	Ψ Τ House
<i>sc</i>	Edward Henry Beaver.....	<i>Schenectady</i>	310 Victory Ave.
<i>en</i>	Russell Edwin Bellinger.....	<i>Herkimer</i>	S. S. N. C.
<i>cl</i>	Pierre MacDonald Bleecker....	<i>Jersey City, N. J.</i>	N. S. N. C.
<i>en</i>	Charles Calvin Bowman, Jr....	<i>Pittston, Pa.</i>	A Δ Φ House
<i>en</i>	Law W. Bowman.....	<i>Pittston, Pa.</i>	A Δ Φ House
<i>sc</i>	Edward Winchester Bradford..	<i>South Gardner, Mass.</i>	N. S. N. C.
<i>cl</i>	Charles Albert Brind, Jr.....	<i>Albany</i>	N. S. S. C.
<i>en</i>	James Boyd Bunyan.....	<i>Ballston</i>	Pyramid Club
<i>en</i>	Francis John Campbell.....	<i>Schenectady</i>	139 Parkwood Blvd.
<i>sc</i>	Forrest Edwin Carr.....	<i>Richmondville</i>	103 James St.
<i>sc</i>	Warren Crosby Carter.....	<i>Malden, Mass.</i>	24 Kay St.
<i>en</i>	Edward Spencer Cassedy.....	<i>Gloversville</i>	B Θ Π House
<i>en</i>	Ernest Christman	<i>Johnstown</i>	S. S. N. C.
<i>sc</i>	Robert Cameron Cochburn....	<i>Watervliet</i>	Λ Χ Α House
<i>en</i>	Charles Edmiston Craven, Jr..	<i>Mattituck</i>	O. G.
<i>en</i>	Leopoldo Cunha, Jr.....	<i>Amparo, S. Paulo, Brazil</i>	N.S.S.C.
<i>en</i>	Leonard Thomas Cunningham	<i>Schenectady</i>	1103 State St.
<i>en</i>	James Ferdinand Davidson....	<i>Oshkosh, Wis.</i>	Φ Γ Δ House
<i>en</i>	James Oliver Davis.....	<i>Newark, N. J.</i>	777 Nott St.
<i>cl</i>	Samuel Elmer Davis, Jr.....	<i>West Albany</i> ..	Stop 14, Albany Rd.
<i>en</i>	Harvey Leander Day.....	<i>Lowville</i>	S. S. N. C.
<i>en</i>	Charles Jewell De Laplante....	<i>Buffalo</i>	Α Δ Φ House
<i>sc</i>	Charles De La Vergne.....	<i>Kingston</i>	Α Δ Φ House
<i>en</i>	Ralph Marston De Rose.....	<i>Gloversville</i>	North Colonnade
<i>cl</i>	Arthur Buckingham Dougall..	<i>Schenectady</i>	1103 Union St.
<i>en</i>	Albert Wynkoop Du Bois.....	<i>Athens</i>	Ψ Τ House
<i>sc</i>	Robert Roy Faust.....	<i>Schenectady</i>	19 Jay St.
<i>en</i>	Glenn Lamont Forrest.....	<i>Cold Brook</i>	5 Avon Rd.
<i>en</i>	Leo Laurence Frees.....	<i>Schenectady</i>	103 Barrett St.
<i>sc</i>	George Laverick Frisbee.....	<i>Hamburg</i>	B Θ Π House
<i>en</i>	Charles Peter Gade.....	<i>Fullers</i>	207 Hulett St.
<i>*cl</i>	John Franklin Genung, Jr.....	<i>Amherst, Mass.</i>	Δ Τ House

<i>en</i>	Harold Henwood Gillespie.....	<i>New York City</i>	Ψ T House
<i>sc</i>	Ernest M. Gloeckner.....	<i>Watervliet</i>.....35	Wendell Ave.
<i>en</i>	Homer Pershing Goff, Jr.....	<i>Crafton, Pa.</i>	A Δ Φ House
<i>ls</i>	Karl Hashagen Gorham.....	<i>Lenox, Mass.</i>	Φ Γ Δ House
<i>cl</i>	Arthur Dailey Greene.....	<i>Schenectady</i>	Δ X A House
<i>sc</i>	James Alfred Greene, Jr.....	<i>Albany</i>	Φ Δ Θ House
<i>en</i>	Carroll Calkins Grinnell.....	<i>Elmira</i>	Δ T House
<i>en</i>	Edmund Judson Griswold.....	<i>Slingerlands</i>	X Ψ Lodge
<i>en</i>	Harold Van Dyke Gulick.....	<i>Brooklyn</i>	B Θ Π House
<i>en</i>	Edward Harvey Hall.....	<i>Luzerne</i>	M. S. S. C.
<i>en</i>	Harry Lee Hart.....	<i>Albany</i> ..27	Menands Rd., Albany
<i>en</i>	John Russell Hartman.....	<i>Lebanon, Pa.</i>	Σ X Place
<i>sc</i>	Douglas Richard Hathaway....	<i>Schenectady</i> ...36	N. Wendell Av.
<i>en</i>	Alvaro Junqueira, Jr.....	<i>Curityba, Brazil</i>	N. S. S. C.
<i>sc</i>	Roland Van Ingen Kathan....	<i>Schenectady</i>	Ψ T House
<i>en</i>	Warren George Kelsey.....	<i>Portland, Me.</i>	B Θ Π House
<i>en</i>	Michael Marian Kolodziej.....	<i>Adams, Mass.</i>	S. S. S. C.
<i>en</i>	Alfred Sisson Ladd.....	<i>Holyoke, Mass.</i>	Δ T House
<i>en</i>	Allin Wilbur Ladd.....	<i>Holyoke, Mass.</i>	Δ T House
<i>cl</i>	Roland Eugene La Grange....	<i>Schenectady</i> ..149	Guilderland Ave.
<i>en</i>	Robert Nelson Landreth.....	<i>Schenectady</i>	College Hill
<i>en</i>	John Lewis Lehmann, Jr.....	<i>Elmira</i>	Φ Γ Δ House
<i>en</i>	David Beekman Little.....	<i>Rochester</i>	K A Lodge
<i>en</i>	Walker Bevins Lounsbery....	<i>Randall</i>	O. G.
<i>sc</i>	Varner Merrick Lyman.....	<i>Lowville</i>	750 Nott St.
<i>en</i>	Maurice James Mahaney.....	<i>Fort Plain</i>	Pyramid Club
<i>en</i>	Joseph Francis Manion.....	<i>Ferndale</i>	Δ T House
<i>en</i>	Egbert Lowe Marks.....	<i>Niskayuna</i>	Niskayuna
<i>sc</i>	William Bruce May, Jr.....	<i>Irvington-on-Hudson</i> ..	A Δ Φ House
<i>sc</i>	John Warden McCauley, Jr....	<i>Rochester</i>	Ψ T House
<i>sc</i>	Donald Kennedy McCreary....	<i>East Aurora</i>	Σ Φ Place
<i>en</i>	Leon Schuler McGarty.....	<i>Rome</i>	Pyramid Club
<i>sc</i>	William James McGauley.....	<i>Schenectady</i>....812	Hamilton St.
<i>en</i>	Allan McLean	<i>Schenectady</i>	R. F. D. No. 6
<i>en</i>	James Louis McMurray.....	<i>Wildwood, N. J.</i>	O. G.
<i>cl</i>	Raymond Dewey Metzner.....	<i>Glens Falls</i>	North Colonnade
<i>sc</i>	Harry Hazleton Newton.....	<i>Ballston</i>	O. G.
<i>sc</i>	William Pierre Northrop.....	<i>Newburgh</i>....45	Glenwood Blvd.

<i>sc</i>	Charles Folger Oudin.....	<i>Schenectady</i>	7 Union St.
<i>en</i>	George Blaine Parker.....	<i>Amsterdam</i> ..	R. F. D. No. 5, A'dam
<i>en</i>	Lloyd Lester Parker.....	<i>North Adams</i> ,	M. S. S. C.
<i>sc</i>	James Stewart Parsons.....	<i>Gloversville</i>	Δ Φ House
<i>sc</i>	Robert Hamilton Persons.....	<i>East Aurora</i>	A Δ Φ House
<i>sc</i>	Ralph Alonzo Peters.....	<i>Schenectady</i> ..	51 Washington Ave.
<i>sc</i>	Harry Van Ness Philip, Jr....	<i>Schenectady</i> ..	27 Washington Ave.
<i>sc</i>	John Howard Nott Potter....	<i>New York City</i>	Σ Φ Place
<i>en</i>	Joseph Ransdell Powell.....	<i>Lake Providence, La</i> ...	Δ Φ House
<i>en</i>	Allen H. Jackson Preston.....	<i>Elmira</i>	K A Lodge
<i>en</i>	Abel Martin Randall.....	<i>Westerly, R. I.</i>	N. S. S. C.
<i>en</i>	Robert Wayne Raynsford.....	<i>Albany</i>	Δ T House
<i>en</i>	Leonard Nelson Reed.....	<i>Lackawanna</i>	Φ Δ Θ House
<i>en</i>	Fredrick William Reynolds....	<i>Massena Springs</i>	23 Grove Pl.
<i>en</i>	Samuel Robinson	<i>Schenectady</i> ..	319 Schenectady St.
<i>cl</i>	Henry Elchanon Rosenberg....	<i>Glens Falls</i>	357 Veeder Ave.
<i>en</i>	George Dan Rosenthal.....	<i>St. Louis, Mo</i>	O. G.
<i>sc</i>	Walter Andrew Rowley.....	<i>Albion</i>	X Ψ Lodge
<i>en</i>	Sanford Oatman Schamberger	<i>Gloversville</i>	No. Colonnade
<i>sc</i>	Francis William Schnitzlein...	<i>Fort Plain</i>	Pyramid Club
<i>sc</i>	Oscar Joseph Schultz.....	<i>Albany</i>	7 Teunis St., Albany
<i>sc</i>	Roy Augustus Schuyler.....	<i>Pattersonville</i>	Φ Γ Δ House
<i>sc</i>	Madison Lewis Sheely.....	<i>Albany</i>	518 Avenue A
<i>cl</i>	Francis Adam Shields, Jr....	<i>Albany</i>	A Δ Φ House
<i>sc</i>	Henry Oscar Sittner.....	<i>Schenectady</i>	83 Mill St.
<i>en</i>	George Russell Smith.....	<i>Sybertsville, Pa.</i>	Δ X A House
<i>en</i>	De Witt Smith Snell.....	<i>St. Johnsville</i>	Δ T House
<i>en</i>	Fred Griswold Stebbins.....	<i>Little Falls</i>	Δ T House
<i>en</i>	Harold Ransom Tallmadge....	<i>Schenectady</i>	Route No. 49
<i>cl</i>	Brenton Thompson Taylor....	<i>Hartford</i>	Δ Φ House
<i>en</i>	Carl John Tell.....	<i>Milwaukee, Wis</i>	Σ Φ Place
<i>en</i>	Herbert Warren True.....	<i>Fayville, Mass</i>	X Ψ Lodge
<i>en</i>	John Lasher Turner.....	<i>Elmira</i>	35 No. Wendell Ave.
<i>sc</i>	John Wheeler Van Loan.....	<i>Athens</i>	7 Gillespie St.
<i>ls</i>	Charles Benjamin Van Patten..	<i>Carman</i>	Carman
<i>en</i>	Frederick Aldhous Vernon....	<i>Schenectady</i>	Δ X A House
<i>en</i>	Schuyler Ver Planick Vought..	<i>East Aurora</i>	Σ Φ Place
<i>en</i>	William Maxwell Watts.....	<i>Schenectady</i>	1381 Union St.

sc Edwin Willard Yordon.....*Fort Plain*.....X Ψ Lodge
sc Isadore Yavits*Schenectady*North Colonnade
en Norman George Zautner.....*Albany*.....34 Washington Av.
en Jacob Zehfuss*W. Albany*..Stop 20, Albany Rd.
 Sophomores—116

Freshmen, Class of 1920

sc Gerald Andrews*Guilderland*....1249½ Albany St.
sc Robert Matthews Andrews.....*Guilderland*....1249½ Albany St.
sc Leonard Lawrence Asch.....*Schenectady*.....830 Albany St.
sc Stuart Atwood*Watertown, Ct.*.....X Ψ Lodge
ls Ernest Bradford Augur.....*Hartwick*.....Φ Γ Δ House
sc Barent Kissam Barhydt.....*Branford, Ct.*.....B Θ Π House
en Roy Winne Barhydt.....*Carman* Carman
sc Herbert Boutell Barlow.....*Edgewood, R. I.*.....Δ Φ House
en Courtenay Bateman*Columbia, S. C.*.....K A Lodge
ls Charles Frederick Beattie.....*Salem*.....Δ Φ House
sc Earl Bedell*Schenectady*.....502 Summit Ave.
en Douw Frisbie Beekman.....*Middleburgh* O. G.
sc Carroll Everard Benedict.....*Pittsfield, Mass.*..505 Brandy. Av.
en Arthur Hamilton Blackburn...*Danbury, Ct.*.....12 Fehr Ave.
en Thomas Edison Blair.....*Sao Paulo, Brazil*.....O. G.
pm John Joseph Blonkowski.....*Schenectady*..106 Van Guysl'g Av.
en Albert George Blumenstock...*East Springfield*...Φ Δ Θ House
pm Harold Roberts Browne.....*Cobleskill*..4 Chestnut St., Albany
en Sydney Liston Brown, 2nd....*Mamaroneck*.....Ψ T House
en Luther Milton Buyce.....*Speculator*Pyramid Club
sc Edward Brevard Cantey.....*Jamaica*.....Ψ T House
sc Walter Jesse Carvey.....*Newburgh*.....Φ Δ Θ House
sc Julian Edmund de Castro.....*Buffalo*.....X Ψ Lodge
en Richard Rush Church.....*Afton*.....842 Union St.
en Nathaniel Clapp*Baldwinsville*Pyramid Club
en Abram Clark*Gloversville* ...North Colonnade
en James Howard Clark.....*Sidney*.....Δ T House
cl James Mason Cline.....*Amsterdam*.....Φ Γ Δ House
pm Arthur Francis Cody.....*Schenectady*..4 So. Wendell Ave.
cl Albert C. Collins.....*Gloversville*.....Δ Φ House

<i>cl</i>	Frederick Law Comstock.....	<i>Gloversville</i>	B Θ II House
<i>en</i>	Howard Williams Conover.....	<i>Jersey City, N. J.</i>	B Θ II House
<i>en</i>	Ellsworth De Witt Cook.....	<i>Scotia</i>	43 Ballston Av., Scotia
<i>en</i>	Charles Clement Corey.....	<i>Naples</i>	110 Van Vranken Ave.
<i>en</i>	Frank Anthony Corigliano.....	<i>Ossining</i>	O. G.
<i>pm</i>	Mario Joseph Cuoco.....	<i>Troy</i>	1463 Fifth Ave., Troy
<i>en</i>	Alan Caldwell Curtis	<i>Schenectady</i>	12 Stratford Rd.
<i>en</i>	Louis Sullivan Cusato.....	<i>Schenectady</i>	16 Oakwood Ave.
<i>en</i>	John Dalton	<i>Schenectady</i>	A Δ Φ House
<i>en</i>	Wilfred Dalton	<i>Schenectady</i>	A Δ Φ House
<i>en</i>	William Hamlet Dean.....	<i>Manchester, Ct.</i>	Δ X A House
<i>en</i>	Walter Johns Decker, Jr.....	<i>Hunter</i>	O. G.
<i>en</i>	Robert Stokes Densham.....	<i>Schenectady</i>	712 Campbell Ave.
<i>en</i>	James Francis Edward Dolan...	<i>Schenectady</i>	340 Carrie St.
<i>sc</i>	Richard Joseph Donovan.....	<i>New Rochelle</i>	X Ψ Lodge
<i>cl</i>	William Paxton Dougall.....	<i>Schenectady</i>	1103 Union St.
<i>en</i>	Harry D. Eckler.....	<i>Cooperstown</i>	Δ T House
<i>en</i>	Waldron Eddy	<i>Greenwich</i>	B Θ II House
<i>sc</i>	Jerome Clarence Eisenberg....	<i>Schenectady</i>	126 Clinton St.
<i>en</i>	Albert William Erdman, Jr....	<i>Schenectady</i>	A Δ Φ House
<i>sc</i>	George James Fallon.....	<i>Schenectady</i> ...	917 Delamont Ave.
<i>pm</i>	William Joseph Fallon.....	<i>Schenectady</i> ...	917 Delamont Ave.
<i>pm</i>	Theron S. Fay.....	<i>Gloversville</i>	841 Union St.
<i>en</i>	James Joseph Fitzsimons.....	<i>Schenectady</i>	704 South Ave.
<i>en</i>	Arthur Thomas Flood.....	<i>Hudson Falls</i>	Ψ T House
<i>sc</i>	Harry Charles Foster, Jr.....	<i>Oak Park, Ill.</i>	Φ Δ Θ House
<i>en</i>	Donald Morgans Forsyth.....	<i>Middletown</i>	33 University Pl.
<i>sc</i>	George Henry Fox, Jr.....	<i>Richmondville</i>	841 Union St.
<i>en</i>	Albert Benton Freedman.....	<i>Schenectady</i>	201 Park Ave.
<i>sc</i>	Warren Sears Gale.....	<i>Milford, Ct.</i>	Φ Γ Δ House
<i>en</i>	Leonard Joseph Gans.....	<i>Lynchburg, Va.</i>	N. S. S. C.
<i>sc</i>	Charles De Wolf Gibson.....	<i>Schenectady</i>	5 Union St.
<i>en</i>	Carl Wilson Gillespie.....	<i>Scotia</i> ...37	Mohawk Ave., Scotia
<i>pm</i>	Donald Briggs Glezen.....	<i>Lisle</i>	110 Van Vranken Ave.
<i>sc</i>	William Greely, Jr.....	<i>Fort Plain</i>	Δ Φ House
<i>en</i>	Clair Mansfield Guild.....	<i>Hancock</i>	Pyramid Club
<i>sc</i>	Julian David Hagar.....	<i>Cobleskill</i>	841 Union St.
<i>sc</i>	William Thompson Hanley.....	<i>Manchester Depot, Vt.</i>	B Θ II House

<i>en</i>	Lawrence Eugene Harmon, Jr.	<i>Buffalo</i>	Δ T House
<i>sc</i>	Russell Wisner Harris.....	<i>Lowville</i>	750 Nott St.
<i>en</i>	Thurlow Devlin Harter.....	<i>Herkimer</i> ..	209 Van Vranken Ave.
<i>en</i>	Charles Easton Hartman.....	<i>Sharon Springs</i>	841 Union St.
<i>en</i>	Nerses Hartsakordzian	<i>Green Island</i>	206 Lafayette St.
<i>cl</i>	Wesley Cornelius Heimhilger...	<i>Castorland</i>	1503 Union St.
<i>cl</i>	Arthur Ward Hendrickson.....	<i>Queens</i>	Ψ T House
<i>sc</i>	John Wesley Hoag.....	<i>Schenectady</i>	Σ Φ Place
<i>en</i>	Amos William Hodgkiss.....	<i>Auburn</i>	Φ Δ Θ House
<i>en</i>	Francis Edwin Holleran, Jr....	<i>Balboa, Canal Zone</i>	O. G.
<i>cl</i>	John Bassnett Hoppe.....	<i>Arlington</i>	N. S. S. C.
<i>sc</i>	Collis Potter Hudson.....	<i>Orlando, Fla</i>	25 Eagle St.
<i>sc</i>	William Proudman Husted....	<i>Delmar</i>	Φ Δ Θ House
<i>en</i>	George Hughes	<i>Flushing</i>	K A Lodge
<i>pm</i>	Lynden Andrew Hulbert.....	<i>Middleburg</i>	841 Union St.
<i>en</i>	Wallace Noel Hunter.....	<i>Yonkers</i>	231 Union St.
<i>sc</i>	John Irving, Jr.....	<i>New York City</i>	O. G.
<i>pm</i>	John Paul Jaffarian.....	<i>Troy</i>	1101 Hutton St., Troy
<i>pm</i>	William John Jameson.....	<i>Schenectady</i>	227 Liberty St.
<i>sc</i>	Richard Irwin Johannesen.....	<i>Pittsfield, Mass</i>	Φ Γ Δ House
<i>pm</i>	Edwin Charles Johnson.....	<i>Schenectady</i>	11 Columbia St.
<i>sc</i>	Robert Waits Jones.....	<i>Watertown</i>	Ψ T House
<i>sc</i>	Wolcott Leander Jones.....	<i>Albany</i>	B Θ Π House
<i>en</i>	William Kidder	<i>Fergus Falls, Minn</i>	X Ψ Lodge
<i>en</i>	Frederic Donald King.....	<i>Fulton</i>	O. G.
<i>en</i>	Wendell Wilford King.....	<i>No. Troy</i> ..	778 1st Av., No. Troy
<i>sc</i>	George Frank Kinney.....	<i>Hudson Falls</i>	4 Douglass Rd.
<i>en</i>	Leo Kliwen	<i>Schenectady</i>	1010 Stanley St.
<i>en</i>	Georold Walter Knapp.....	<i>Watervliet</i>	4 Barrett St
<i>cl</i>	William Theodore Knapp.....	<i>Rutland, Vt.</i> ..	1524 3d Av., W'vliet
<i>sc</i>	Martin Korngut	<i>Amsterdam</i> ..	33 Church St., A'dam
<i>pm</i>	Leo Krause	<i>Schenectady</i>	637 Hamilton St.
<i>en</i>	Edward Houghton Kurth.....	<i>Schenectady</i>	731 Nott St.
<i>pm</i>	Louis Arnold Lackey.....	<i>Pittsfield, Mass</i> ..	508 Hamilton St.
<i>pm</i>	Joseph Paul Laczko.....	<i>Schenectady</i> ..	R. D. No. 5, Box 41
<i>en</i>	Paul Henry Lair.....	<i>Gloversville</i>	North Colonnade
<i>en</i>	Sol Charles Lefkowitz.....	<i>Rochester</i>	S. S. S. C.
<i>en</i>	Harry Lloyd Lewis.....	<i>Newton, N. J</i>	705 Nott St.

<i>cl</i>	Jerome Loevenheim	<i>Amsterdam</i> ..162 Division St., A'dam
<i>en</i>	Abner Marshall Lowman.....	<i>Elmira</i>.....Ψ Υ House
<i>sc</i>	Delavan Henry Lyman.....	<i>Lowville</i>.....750 Nott St.
<i>en</i>	Earl Victor Mace.....	<i>Keeseville</i>.....Δ Φ House
<i>en</i>	Edward Joynes Macfarlan.....	<i>Darlington, S. C.</i>.....K A Lodge
<i>sc</i>	Stuart Forbes MacMillan.....	<i>Schenectady</i> ..145 Glenwood Blvd.
<i>en</i>	George Addison Makely.....	<i>Hensonville</i>.....503 Union St.
<i>pm</i>	William Mitchell Mallia.....	<i>Schenectady</i> ..417 Schenectady St.
<i>en</i>	Wilbur Wilson Marks.....	<i>Middletown</i>.....33 University Pl.
<i>sc</i>	Conover Emerson Marsh.....	<i>New York City</i>.....X Ψ Lodge
<i>sc</i>	Williamson Henry Martin.....	<i>Laukens, S. C.</i>.....K A Lodge
<i>sc</i>	William Edgar Mayer.....	<i>Buffalo</i>.....S. S. N. C.
<i>cl</i>	Frank Rollin McAllester.....	<i>Lake View</i>.....N. S. N. C.
<i>en</i>	Ezekiel McCleary	<i>Amsterdam</i>.....S. S. N. C.
<i>ls</i>	William McCleary	<i>Amsterdam</i>.....Φ Γ Δ House
<i>sc</i>	Harold Julius McGee.....	<i>Schenectady</i> ..10 No. Wendell Av.
<i>en</i>	Frederick Hadger McMaster..	<i>Geneva</i>.....X Ψ Lodge
<i>sc</i>	Henry Wilson Micks.....	<i>Seneca Falls</i>.....A Δ Φ House
<i>en</i>	Charles Cox Mockridge.....	<i>Dover, N. J.</i>.....N. S. S. C.
<i>sc</i>	Henry Mohler	<i>Poughkeepsie</i> ...North Colonnade
<i>cl</i>	George Raymond Moore.....	<i>Schenectady</i>.....601 Union St.
<i>en</i>	Harry Lee Moore.....	<i>Jersey City, N. J.</i> ...N. S. N. C.
<i>pm</i>	Demetrius Constantine Mustakis	<i>Brooklyn</i>....31 N. Wendell Ave.
<i>en</i>	Ira Rodgers Nelson.....	<i>South Orange, N. J.</i> ...Δ Υ House
<i>sc</i>	Arthur Laine Notman.....	<i>Buffalo</i>.....A Δ Φ House
<i>sc</i>	Raymond J. O'Brien.....	<i>Schenectady</i> ..1303 Campbell Ave.
<i>sc</i>	Raymond Sweetlove Perry....	<i>Utica</i>.....111 Wendell Ave.
<i>ls</i>	Antwine James Pheneuf.....	<i>Perry's Mills</i>.....834 Union St.
<i>en</i>	John Poeppel	<i>Rossville, N. Y. C.</i> ..910 Albany St.
<i>en</i>	Marselis Powell	<i>Scotia</i>.....X Ψ Lodge
<i>en</i>	William Stanley Price.....	<i>Oneida</i>.....Ψ Υ House
<i>en</i>	Henry Van de Vere Putnam....	<i>Barker</i>.....802 Campbell Ave.
<i>pm</i>	John Joseph Quinlan.....	<i>Watervliet</i> ..1340 5th Av., W'vliet
<i>en</i>	Arthur Rablen	<i>Albany</i> ...70 Central Ave., Albany
<i>pm</i>	Tom Joseph Reardon.....	<i>Little Falls</i>.....B Θ II House
<i>en</i>	Francisco de C. Ribeiro.....	<i>Mueas Geraes, Brazil</i>.....O. G.
<i>en</i>	Nelson Alden Ripley.....	<i>Morris</i>.....Φ Δ Θ House
<i>sc</i>	Morris David Rock.....	<i>Schenectady</i>.....944 Emmett St.

<i>pm</i>	Charles Fayette Rourke.....	<i>Portlandville</i>	M. S. S. C.
<i>en</i>	George Clemens Baxter Rowe, Jr.....	<i>Philadelphia</i>	X Ψ Lodge
<i>sc</i>	Fenton Charles Rowell.....	<i>Schenectady</i>	833 Locust Ave.
<i>pm</i>	Hyman Sacharoff	<i>Schenectady</i>	304 Congress St.
<i>en</i>	Jose Ribeiro Saramago.....	<i>Nictheroy, Brazil</i>	725 Eastern Av.
<i>pm</i>	Marvin Stowe Saxe.....	<i>Rensselaer</i>	Δ Φ House
<i>sc</i>	Victor Herman Scales.....	<i>Glens Falls</i>	Δ Φ House
<i>en</i>	Leon David Schermerhorn.....	<i>Lake George</i>	68 Union Ave.
<i>sc</i>	Charles Schulman	<i>Schenectady</i>	36 Foster Ave.
<i>sc</i>	John Gorton Seabury.....	<i>Ballston Lake</i>	Ballston Lake
<i>en</i>	Frank William Seelbinder.....	<i>Somerset</i>	North Colonnade
<i>pm</i>	Melville James Shannon.....	<i>Schenectady</i>	208 Crane St.
<i>en</i>	Vincent Allen Sheals.....	<i>Brushtown</i>	501 Brandywine Ave.
<i>sc</i>	Kenneth Scott Sheldon.....	<i>Oakdale, Mass.</i>	181 Division St.
<i>sc</i>	David Winne Sherwood.....	<i>Ballston Spa</i>	Ψ Υ House
<i>cl</i>	Elmer Leonard Smith.....	<i>Hagaman</i>	Pyramid Club
<i>en</i>	Henry James Smith.....	<i>Schenectady</i>	39 Parkwood Blvd.
<i>en</i>	Seymour Ralph Smith.....	<i>Oakville, Ct.</i>	O. G.
<i>sc</i>	William Smith	<i>Schenectady</i>	311 Glenwood Blvd.
<i>sc</i>	Harold Wayne Snyder.....	<i>Scotia</i>	124 James St., Scotia
<i>en</i>	John Littleton Dawson Speer, Jr.....	<i>Baltimore</i>	Σ Φ Place
<i>en</i>	Otto Stein	<i>Grantwood, N. J.</i>	N. S. N. C.
<i>sc</i>	Charles Streeter, Jr.....	<i>Scotia</i>	108 First St., Scotia
<i>pm</i>	Lyle Adin Sutton.....	<i>Prattsville</i>	O. G.
<i>ls</i>	Clement Frank Theisen, Jr.....	<i>Albany</i>	Σ Φ Place
<i>pm</i>	William McCheyne Thomson.....	<i>Delhi</i>	29 Furman St.
<i>en</i>	Robert Tiel	<i>Middletown</i>	117 Park Ave.
<i>sc</i>	Warren Irving Titus.....	<i>Coxsackie</i>	Φ Δ Θ House
<i>cl</i>	Cantine Tremper	<i>Albany</i>	Σ Φ Place
<i>en</i>	Raymond Miles Turnbull.....	<i>Schenectady</i>	205 Union St.
<i>en</i>	Arthur Milton Underwood.....	<i>Schenectady</i>	202 Wright Ave.
<i>en</i>	Raymond George Urban.....	<i>Buffalo</i>	K Δ Lodge
<i>sc</i>	James Ceylon Van Deusen.....	<i>Cooperstown</i>	777 Nott St.
<i>sc</i>	De Camp Van Vranken.....	<i>Schenectady</i>	Un. Av. & Univ. Pl.
<i>ls</i>	Henry Vaughn, Jr.....	<i>Danbury, Ct.</i>	17 Eagle St.
<i>sc</i>	Samuel Vinick	<i>Schenectady</i>	319 Seward Pl.
<i>sc</i>	Henry Cowles Wadsworth.....	<i>Buffalo</i>	A Δ Φ House
<i>sc</i>	Ernst Kaspar Wahl.....	<i>Chicago, Ill.</i>	Φ Γ Δ House

<i>en</i>	Edward Benedict Wallace.....	<i>Schenectady</i>	353	McClellan St.
<i>en</i>	William Le Roy Warner.....	<i>Perry</i>		North Colonnade
<i>sc</i>	George Alfred Weinhold.....	<i>Schenectady</i>	218	Holland Rd.
<i>en</i>	Joseph Louis Weinert, Jr.....	<i>New York City</i>		Φ Δ Θ House
<i>pm</i>	Charles Edward Wiedenman....	<i>Schenectady</i>	605	Craig St.
<i>en</i>	Gilbert Henry Wiley.....	<i>North Granville</i>	1422	State St.
<i>sc</i>	Edward Noble Wilkes, Jr.....	<i>Buffalo</i>		Δ T House
<i>sc</i>	Joseph Girven Wilkenson.....	<i>Buffalo</i>		A Δ Φ House
<i>sc</i>	John Harold Wittner.....	<i>New York City</i>		Φ Δ Θ House
<i>en</i>	Edwin R. Wood.....	<i>Glenmont</i> ..	112	Van Vranken Ave.
<i>sc</i>	Clarence Upson Young.....	<i>Los Angeles, Calif</i>		Ψ T House
Freshmen—193				

Summary of Students, Union College

Candidates for the Master's Degree (in absentia).....	23
Graduate Students (in residence).....	30
Seniors	92
Juniors	94
Sophomores	116
Freshmen	193
Total	548

STUDENTS OF THE ALBANY MEDICAL COLLEGE

Fourth Year Class

Stanley Earl Alderson.....	Little Falls
Milton Aronowitz, B. S.....	Albany
James Michael Bernhard.....	Albany
Sidney William Bisgrove, B. S.....	Schenectady
Anathol Michael Breault.....	Cohoes
Leroy Joseph Butler.....	Waterford
Byron Edwin Chapman.....	Broadalbin
Norman Scott Cooper.....	Athens
Leon Charles Coté.....	Lake George
Lawrence Henry Cotter.....	Poughkeepsie
Howard Wilcox Davis.....	Schenectady
Edward Thomas Delehanty.....	Albany
Louis Joseph DeRusso.....	Albany
Albert Stuart Ferguson.....	Schenectady
William Edwin Gazeley.....	Albany
Samuel William Green.....	Brooklyn
Daniel Francis Hannon.....	Pittsfield, Mass.
Harold Colvin Haviland.....	Hudson Falls
Kent Wood Jarvis.....	Delanson
Howard Marion Kenyon.....	Albany
Raymond Francis Kircher.....	Albany
Maximilian Kohlenberg, Jr.....	Brooklyn
Robert Atherton MacTaggart.....	Schenectady
John Francis McGovern, Jr.....	New Brunswick, N. J.
Charles Mester.....	New York
William Panitch	Brainard
George Trecise Polk, Jr.....	Poughkeepsie
John Joseph Randall.....	Albany
Jacob Resnik.....	New York
John Harry Robbins, Ph. G.....	Rensselaer
John Hourne Robertson.....	South Glens Falls
Ivan Michael Schneible.....	Albany
Norman Leo Sheehe.....	Dunkirk
George Milo Thomas.....	Adams Centre
Ralph Waldo Turner.....	Albany
Chester Bruce Van Gaasbeek.....	Kingston

Irving Van Woert.....	Albany
George Clark Vogt.....	Kingston
Frank William Aloy Wehle.....	Rochester
Aaron Weinberg.....	New York
Earle Wayne Wilkins.....	West Albany
Burchard Alfred Winne.....	Hancock
Fourth Year Class — 42.	

Third Year Class

Charles Pahl Archambeault.....	Albany
Clarence Walter Barth.....	Schaghticoke
Edward Buckley Campbell, A.B.	Cohoes
Hubert Francis Carroll.....	Indian Lake
James Jasoloski Clement.....	Schenectady
Mark Joseph Daley.....	Albany
Albert Henry Faber, Jr.....	Schenectady
Carl Charles Giannotti.....	New Haven, Conn.
Charles Willard Green	Schenectady
Albert Leonard Hayes.....	Hoosick Falls
Charles James Higley.....	North Adams, Mass.
Patrick Henry Huntington.....	Fort Edward
Milton Jacobson	Troy
Gerald Reid Jameison.....	Albany
Frank Andrew Kane.....	Albany
Barney Weeks Phillips.....	Hartwick
Gerald Herbert Porter.....	Wilmington, Vt.
Donald Dean Prentice	Pittsfield, Mass.
Edward Grady Sheehan.....	Watervliet
George Edward Smith.....	Troy
Charles Francis Walsh.....	Watervliet
Third Year Class — 21.	

Second Year Class

Romeyn Treadwell Allen.....	Schenectady
Lawrence James Dailey, Jr.....	Gloversville
Jacob Epstein	Poughkeepsie
George Otis Gilman.....	Ballston Spa
Joseph O'Connor Kiernan.....	Troy

William Francis McDermott.....	Waterford
Alfred Lawrence Madden.....	Troy
Alexander Mason.....	Gloversville
Floyd Edward Miller.....	Warsaw
Webster Merchant Moriarta.....	Saratoga Springs
John Joseph Phelan, Jr.....	Albany
Alexander William Pietraszewski.....	Schenectady
Edson Hun Steele.....	Mongaup Valley
Second Year Class — 13.	

First Year Class

Douglas Anderson Calhoun.....	Watervliet
Bernard Roger Coleman.....	Green Island
Alfredo Gustavo Conte.....	Schenectady
Joseph Cornell.....	Scotia
Walter James Craig.....	Albany
Percy Lawrence De Noyelles.....	Jersey City, N. J.
Edward Joseph Fitzgerald.....	Glens Falls
William Lawrence Gould.....	Albany
Lawrence Daniel Greene.....	Petersburg
Walter Cornelius Haley.....	Syracuse
Harold Jerome Harris.....	Albany
Chester Amos Haug.....	New York City
Leland Earl Hinsie.....	Schenectady
John Wgner Jackson.....	Fort Plain
John Albert Kelk.....	Cairo
Maver Miller Lee.....	Schenectady
Gilbert Coffin MacKenzie.....	Millbrook
Fred Burton MacNaughton.....	Troy
Harold Edwin Marden.....	Troy
Thomas Sylvester Mooney.....	Cohoes
Roy Ferris Myers.....	Schenectady
Thomas William Phelan.....	Troy
Walter Fred Preusser.....	Albany
William George Richtmyer.....	Albany
Sumner Conrad Rowe.....	Elsmere
Anton S. Schneider.....	Albany
Homer L. Stephens.....	Gardiner

Reginald Van Woert.....	Athens
Schuyler Vroman	Middleburgh
Asher Yaguda	Albany
Haroutune George Yesayian.....	Troy
Mandel Zuckerman	Albany
First Year Class — 32.	

Special Students

Anthony Salvatore Pendola.....	Albany
George Nelson Leonard.....	Albany
Special Students — 2.	

Summary of Students, Albany Medical College

Fourth Year Class.....	42
Third Year Class.....	21
Second Year Class.....	13
First Year Class.....	32
Special Students	2
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Total	110
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STUDENTS OF THE ALBANY LAW SCHOOL

Third Year Class

Charles P. Andrews.....	Saratoga Spa
John K. Austin.....	Schenectady
James A. Ball.....	Watervliet
Chatfield T. Bates.....	Schenectady
Arthur A. Beaudry.....	Cohoes
David Belkin	Albany
Clarence K. Butler.....	Saratoga Spa
Edgar D. Cantwell.....	Albany
Irving J. Chamberlain.....	Cohoes
F. Raemond Chant.....	Johnstown
Earle G. Clarke.....	Mechanicsville
Charles C. Coleman.....	Goshen
Hugh J. Crum.. ..	Selkirk
William F. Darby.....	Troy
William Deckelman	Obernburg
Frank E. Devans.....	Rochester
Anna Grace Dolan.....	Albany
Decelia A. Doran.....	Troy
Edgar J. Downs.....	Peru
Marion E. Dunham.....	Saratoga
Rodney Ray Ellis.....	Poultney, Vt.
Kenneth H. Fake.....	Cobleskill
A. L. Flanders.....	St. Johnsville
Maurice Walter Flynn.....	Westerly, R. I.
E. Ralph Gosier.....	Rosiere
Frederick G. Hazard.....	Utica
Leonard F. Herzog.....	Syracuse
Thomas Palmer Huxtable.....	Troy
John G. Hines.....	Albany
Maurice M. Katz.....	Schenectady
John J. Kelly.....	Troy
John M. Knapp.....	Hurleyville
John A. Kosinski.....	Amsterdam
W. Mace Laraway.....	Oak Hill
Floyd A. Lane.....	Menands

Louis Lieberman	Rensselaer
Michael D. Lombardo.....	Jamestown
Ernest P. Lyons.....	Plattsburgh
James A. McCarthy.....	Troy
Joseph B. McEntee.....	Albany
James J. Macksey.....	Norwich
Carleton Marvin.....	Hoosick Falls
Nathan Medwin	Albany
Joseph M. Mesnig.....	Troy
Amos Delany Moscrip.....	Albany
James M. Noonan.....	Mechanicsville
James B. O'Brien.....	Glens Falls
Edward C. O'Connell.....	Barrytown
Charles O'Donnell	Poughkeepsie
Thomas Francis O'Neil.....	Albany
Albert J. Ornsteen, Jr.....	Poughkeepsie
Katharine A. Paddock.....	Malone
Andrew A. Padula.....	Albany
Helen Burritt Page.....	Albany
Herbert J. Ramber.....	Webster
Kenneth W. Rice.....	Albany
E. Howard Ringrose.....	Rome
Benjamin Saperstein	Troy
Monroe Scheslinger	Kingston
John M. Schneider.....	Albany
Eugene J. Sheeran.....	Albany
Meyer H. Slack.....	Haverstraw
Lawrence Stage	Warwick
G. Gordon Steele.....	Albion
Clifford C. Tennies.....	E. Randolph
Hugh K. Tobias.....	Albany
Maynard K. Van Deusen.....	Cobleskill
Harold W. Ward.....	Gloversville
Robert H. Wright.....	Rensselaer
Coplon Yaras	Albany

Third Year Class—70.

Second Year Class

Mariano Acosta.....	Mayaguez, Porto Rico
George H. Anderson.....	Dexter
Frank H. Andrews.....	Olean
William D. Bell.....	Heuvelton
Willard L. Best.....	Cape Vincent
Harold R. Beyerl.....	Schenectady
Earle N. Bishopp.....	Munnsville
Chester A. Blauvelt.....	Albany
John E. Bossidy.....	West Stockbridge, Mass.
Lael William Breen.....	Lowville
Raymond J. Brown.....	Syracuse
Donald L. Brush.....	Herkimer
Raymond E. Burdick.....	Gloversville
Gardner King Byers.....	Suffern
Paul D. Carrigg.....	Owego
T. Barton Chaffee.....	Albany
Edward Jun Chü.....	Canton, China
Morris Cohen	Newburgh
Edward F. Collisson.....	Troy
Andrew J. Culick.....	Amsterdam
Kenneth W. Davidson.....	Oshkosh, Wis.
Howard B. Donaldson.....	St. Lawrence
James S. Drake, Jr.....	Bath
C. B. Dunham.....	Westkill
Clement Fernandez, Jr.....	Carolina, Porto Rico
Anthony Fischette	Clyde
Harry J. Frey.....	Rochester
John F. Gallagher.....	Westerly, R. I.
Ashley C. Glover.....	Schenectady
Abe C. Goldstein.....	Troy
Emmett A. Glynn.....	Johnstown
Joseph H. Harris.....	Kattskill Bay
Mark Heath	Bergen
James H. Hoffnagle.....	Ticonderoga
E. Francis Holland.....	Schenectady
Minnie Humphrey	Cobleskill

Charles J. Hyde.....	Norfolk, Neb.
Leona M. Johnson.....	Granville
Morris J. Kaman.....	Rochester
Vincent Kiebal.....	Buffalo
Wm. J. Killea, Jr.....	Albany
Chandler S. Knight.....	Schenectady
John Knox	Albany
Henry Landau	Albany
Joseph A. Landry.....	Rouses Point
William F. Leary.....	Richfield Springs
Edward J. Leyden.....	Troy
John D. Lynn, A. B.....	Rochester
W. Elmer Lyons.....	Schenectady
Thomas W. McDonald.....	Port Henry
John C. McEntee.....	Albany
George E. McKernon.....	Schenectady
Armon D. McQuillan.....	Plattsburgh
Wm. F. Madsen.....	Poughkeepsie
William J. Mahar.....	Troy
Stephen Majewski	Schenectady
George A. Marcus.....	Schenectady
W. Earl Mengerink.....	Rochester
Eugene A. Molitor.....	Albany
John A. Moran.....	Troy
Robert F. T. O'Connor.....	Albany
Harold J. O'Keeffe.....	Luzerne
Hugh Francis O'Neil.....	Schenectady
Frank T. Quinn.....	Norwich
William S. Quinterro.....	Poughkeepsie
Paul E. Quirin.....	Albany
John Raphael Riley.....	Plattsburgh
Wells Rossiter Ritch.....	Port Jefferson, L. I.
Edward G. Rogan.....	Albany
Allen Rosenberg	Rochester
Edward F. Ryan.....	Monticello
Charles Schlager	Binghamton
Franklin A. Schriver.....	Chester
James E. Scully.....	Rensselaer

Joseph Shanley	Troy
E. E. Sherman	New Baltimore
Richard J. Sherman	Saratoga
Andrew Lenox Smith	Bolton Landing
Thomas Sylvester	Albany
George M. Skinner	Albany
Louis Snyder	Albany
Joseph Edward Spain	Troy
John B. Sterley	Ravena
Alexander A. Stewart	Burnt Hills
Arlen T. St. Louis	Schenectady
Francis A. Sturges	Waterport
Walter F. Swanker	Schenectady
Lewis A. Taylor	Hancock
James A. Thompson	Schenectady
Benjamin I. Tunick	Port Chester
Richard Tunick	Port Chester
Wm. B. L. Turnbull	Campbell
Samuel J. Van Kleeck	Kerhonkson
John William Welch	Coxsackie
W. Augustus Williams	Warsaw
Hingting Wong	Hongkong, China

Second Year Class — 96.

First Year Class

Frederico De Acosta	Mayaguez, P. R.
James Anderson	Caledonia
George L. Andrews	Owego
Leon Aronowitz	Albany
William B. Ashton	Yonkers
Earle C. Bastow	Hoosick Falls
Antonio Berlingeri, J.	Ponce, P. R.
Joseph Besch, Jr.	Albany
Frank J. Blanchard	Albany
Charles B. Brasser	Williamson
Leo W. Breed	Baldwinsville
Earle L. Brooks	Rochester
Wm. W. Bullis	Corinth

Walter Byrnes	Schenectady
Rocco Calli	Canastota
Oscar S. Caplan.....	Rochester
Thomas P. Cawley.....	Albany
A. Vernon Clements.....	Rochester
William L. Cohn.....	Saratoga Springs
James M. Conboy.....	Cohoes
Scott B. Coons.....	Glens Falls
Lionel Constance.....	Cape Vincent
Frank F. Crawford.....	Saratoga Springs
Kenneth Creble.....	Feura Bush
Sidney Davidson	Rochester
James C. D'Aprile.....	Geneseo
Joseph Earle Derby.....	Troy
Anthony DeStefano	Albany
Leo J. Downs.....	Peru
Harry F. Dunkel.....	Gloversville
W. S. Eaton.....	Albany
Raymond G. Fite.....	Albany
Frederick E. Fox.....	Rochester
Joseph C. Gallup.....	Albany
Will E. Gleadall.....	Davenport, Iowa
Norman H. Glode.....	Champlain
Ruth Goldberg	Albany
Donald H. Grant.....	Hobart
Lawrence Graves	Albany
George W. Greene.....	Kingston
Ray T. Hackett.....	Binghamton
Howard Leslie Hedden.....	New York City
Abram L. Jordan.....	Rensselaer
John Kenny	Troy
Frederck Kronmiller	Utica
Frederick J. Locker.....	Greenport
Robert Stephen Long.....	Plattsburgh
John C. Looby.....	Troy
Charles F. McGovern.....	Albany
Quentin H. MacNeill.....	Cohoes

Joseph J. Mailloux.....	Watervliet
Leo C. Martin.....	Philadelphia, Pa.
John D. Mattice.....	Slingerlands
Walter J. Miller.....	Kingston
Wm. F. D. Noble.....	Schenectady
Francis M. Noonan.....	Gloversville
Ralph F. Nichols.....	Schenectady
B. L. O'Connell.....	Plattsburgh
Matthew S. Ogonowski.....	Schenectady
R. G. Raymond.....	Albany
H. John Rekemeyer.....	Gloversville
Herbert Dana Rhodes.....	Auburn
George B. Roberts.....	Winter Park, Fla.
Helen A. Rouss.....	Newburgh
Louis Sahr.....	Schenectady
Earl Scannell.....	Waterford
Lester A. Schmidt.....	Catskill
Joseph Schron.....	Troy
John H. Shirley.....	Rochester
Fay C. Smith.....	Hoosick Falls
Jacob Snyder.....	Cobleskill
Raymond D. Stickney.....	Albany
Robert Stone.....	Schenectady
Maurie Supiro.....	Utica
Frank A. Tate.....	Mechanicville
Edward Thomas.....	Pittsfield, Mass.
Bruce O. Townsend.....	Trumansburg
Jacob Tumposky.....	Utica
Morton J. Valley.....	Cohoes
Geant P. Voskanyan.....	Albany
Paul W. Vanden Burgh.....	Stockport
Harry W. Walk.....	Green Island
Allan B. Weidman.....	Albany
J. Ernest Wharton.....	Richmondville
Seth G. Widener.....	Rochester
Robert C. Winchell.....	Rochester

First Year Class — 86.

Summary of Students, Albany Law School

Third Year Class	70
Second Year Class.....	96
First Year Class.....	86
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Total	252
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STUDENTS OF THE ALBANY COLLEGE OF PHARMACY

Second Year Class

Louis Jacob Aker.....	Albany
Earl Dean Armstrong.....	Athens
William Henry Barrett.....	Warwick
Willard Kinne Barton.....	Fort Edward
James Henry Bonner, Jr.....	Luzerne
Cecil Edward Brooker.....	Schenectady
Charles Victor Byrne.....	Poughkeepsie
Joseph Candido	Albany
Frederick Lansing Carr.....	Rensselaer
Grant Charles Carter.....	Canaan, Conn.
John Benjamin Cloke.....	Hoosick
Henry Patrick Conron.....	Norwich
Leo Francis Corrigan.....	Dannemora
Ralph Thomas Curtis.....	Troy
Charles Alton Edwards.....	Albany
Lynn Edgecomb Ellis.....	Waverly
Arthur Vincent Ellsworth.....	Glens Falls
Walter John File.....	Mechanicville
Robert Merna Galloway.....	Whitney Point
Harold Glazier	Gouverneur
Gabriel Emmett Greeley.....	Cohoes
Edwin Heisinger	Palonville
Stewart Henry Himes.....	Troy
Meryll Cornelius Hoagland.....	Cobleskill
George Niles Hoffman.....	Chatham
Stewart Hudson	Rouses Point
Edward George Huested.....	South Cairo
Teressa Conway Ingraham.....	Watervliet
Louis Krouner	Nassau
Ralph Patrick Lansing.....	Mechanicville
Robert Reuben Lavine.....	Troy
John Lawrence Lindsay.....	Olmsteadville
Thomas John Mack.....	Troy
J. Carl Manglesdorf.....	Saratoga Springs

Hyman Moses	Newburgh
Thomas Patrick Mullen, Jr.....	North Lawrence
Ethel Naumoff	Schenectady
Ralph David Robertson.....	Amsterdam
Fred Louis Schramme.....	Kingston
Charles Wallace Smith.....	Troy
Charles Edwin Vedder.....	Schenectady
Harold Wensley	Syracuse
John Martin Wild.....	Troy
John Clifford Wilson.....	Kinderhook
George Cornelius Wortley.....	Cambridge
Franklin Norman Wright, Jr.....	Northville
Ralph Young	Cobleskill

Second Year Class — 47.

First Year Class

Caplan Altman	Troy
Harold James Baldwin.....	Chicopee, Mass.
William Frank Barry.....	Fort Edward
Fred Henry Berkholz.....	Elmira
Benjamin Berkowitz	Albany
Lena Katharine Brunette.....	Troy
John Thomas Byrnes.....	Ilion
Martin Joseph Callery.....	Johnstown
Harold Byron Carnrose.....	Carthage
Henry Joseph Carpenter.....	Altona
Edwin Alfred Collamer.....	Gloversville
James Claire Colwell.....	Richfield Springs
Raymond Earl Cressler.....	Kingston
William Frederick D'Aran.....	Lowville
Paul Leo Doran.....	Schuylerville
Leslie Clayton Edsall.....	Warwick
Fred John Carns Elbert.....	Schenectady
Donald Finn	Troy
Buel Hunt Francisco.....	Chatham
John Joseph Geraghty.....	Canajoharie
George Partick Golden.....	Mechanicville

Harold Schermerhorn Greene.....	Hudson
Vincent Francis Guerra.....	Schenectady
Francis Ambrose Hans.....	Albany
Marvin David Harmon.....	Chatham
Francis Stanton Henry.....	Scotia
James Henry Hogan.....	Saratoga Springs
John Joseph Knauf.....	Albany
Alva Tremain Knight.....	Schenectady
Lawrence Clayton Lanfair.....	Diamond Point
Samuel Leviton.....	Albany
Roy Nathaniel Lodewick.....	Castleton
Livingston Fredricksburg Lossa.....	Canajoharie
Anthony Joseph Mack.....	Binghamton
Thomas Augustus McCann.....	Greenwich
Earl Joseph McCarthy.....	Little Falls
Saul Naishtat	Albany
Leo Joseph O'Keeffe.....	Albany
Isadore Patlen	Albany
Isabella M. Purner.....	Cohoes
Clarence Edwin Remsen.....	Middletown
Charles Joseph Rourke.....	Green Island
Joseph George Schell.....	Amsterdam
John Quigley Sheehan.....	Utica
Samuel Hymen Slakter.....	Utica
John Slater	Schenectady
Leo Joseph Smith.....	Port Henry
Hyman Stern	Utica
James Dolan Sullivan.....	South Glens Falls
Wadsworth Trojakowski	Schenectady
Charles Wellington Vars.....	Alfred
Stephen Athenasium Venear.....	Albany
E. Harold Vincent.....	Ghent
Alfred Norman Vyner.....	Utica
Louis Edwin Weber.....	Kingston
Thomas Joseph Wilson.....	Amsterdam

First Year Class — 56.

Summary of Students, Albany College of Pharmacy

Second Year Class.....	47
First Year Class.....	56
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Total	103
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SUMMARY OF STUDENTS, UNION UNIVERSITY

Union College	548
Albany Medical College.....	110
Albany Law School.....	252
Albany College of Pharmacy.....	103
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Total	1013

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